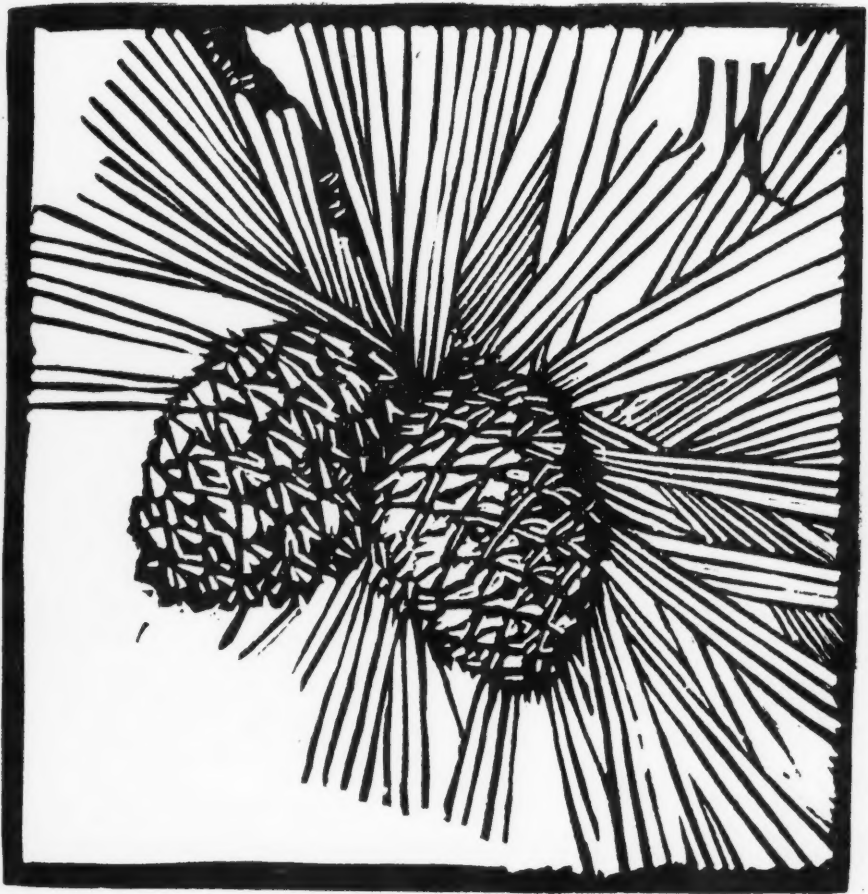


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Robert L. Taylor

[See page 74]

Carolina Jasmine, Gelsemium sempervirens

The Greenhouse as a Workshop

ALIDA LIVINGSTON

There are so many possibilities in greenhouse work, and all of them fascinating, I wish I could have many lives and try them each in turn. Size, heat, expense, time and taste are not limitations but act rather as guides to particular projects.

In Colonial days my great-great-grandfather had exotic plants tucked away in his cargoes of silks, spices and Lowestoft; once he received a little ornamental tree with jade green apples, growing in a cloisonné pot. He thought it came from Persia, was tender and probably poisonous, and not till it grew and grew, threatening to burst the XVIIIth century greenhouse, did he cast it out and learn its true value—it was the Rhode Island Greening.

A hundred years ago my grandfather laboriously grew pineapples and bananas under acres of glass, and to the delight of his children, served those rare delicacies to unenthusiastic guests who politely cut up morsels and silently chewed on the peel.

Of the two extremes, the warm, damp, tropical house, and the unheated Alpine house, I am completely ignorant. The cool greenhouse (40-50 night temperature) threatens to absorb my life, for its possibilities are infinite. As described by Mr. Sutton it is an ornament, a private flower-show the year 'round, changing with the seasons. It may be used to grow pot plants and cut flowers to decorate the house. In it, horticultural sleight-of-hand may be practised, turning out such tricks as potted fruit trees, and all kinds of standards and specimen plants; in these

arts the English and Chinese excel, and their instructions read like recipes for cooking elaborate dishes. I have been tempted by the thought of chrysanthemum plants six feet wide carrying two hundred blossoms, three foot cherry trees looking like red pyramids of fruit, well-laden grape vines light and compact enough to come right on to the dinner table, old twisted plum trees growing and flowering in dainty porcelain bowls, sacred lilies, the bulbs skilfully sliced to produce crowded blossoms in curved horizontal tiers.

Whatever its density the greenhouse should be supplemented by cold frames. Here seedlings started for the summer garden go through a transition period, choice young perennials and shrubs winter safely and sometimes go on developing for a year or two; and here cold-loving plants like pansies, forget-me-nots and wallflowers, are lightly frozen in autumn and early winter before being brought into the greenhouse for a premature spring.

A propagating box is a useful device. Mine is just large enough to hold two flats and a few pots, sitting on a wooden platform surrounded with glass but open on top; under this a shallow tray of water, and at the bottom two small old fashioned kerosene lamps with chimneys, to heat the water in the tray. This arrangement provides bottom heat for rooting cuttings, and extra warmth at little expense for such seeds as require it.

I am fortunate that my greenhouse is almost a part of my house, being connected by a glass enclosed passage, which not only makes it comfortable

to go there at all hours and in all weathers, but provides a perfect wintering place for plants of young lily bulbs and such seeds as must have a cold start.

I have made Cascade chrysanthemums and the easier standards, such as fuchsias, heliotropes and geraniums, and I have grown the easier pot plants, primroses, chrysanthemums, nemesias, schizanthus, cinerarias and cyclamen; cut flowers, like carnations, gerberas, forget-me-nots, pansies, and various annuals. Then pots of daffodils and tulips dug out in January were brought in to be gently urged into bloom. It was very pleasant and reasonably successful. I still have chrysanthemums, gerberas and cyclamen.

The war changed things—there was more to do and less time to do it in; no extra help ever to be had, fuel was scarce and uncertain, and maybe a different spirit came too, so the greenhouse changed into a workshop given over to experiments in plant propagation. Half the space and more than half the time and worry has been given to lilies, but that is a separate story and a long one.

Cuttings have been rooted and grown on, shoots of fancy lilacs begged or stolen—these are difficult; yews, very easy; dwarf spruce from winter-broken branches, an assortment of fuchsias and geraniums, both flowering and scented; thymes, oleanders, fragrant daphne, rosemary, and such like, but the main thing is seeds. Seeds of rare plants, expensive plants, slow plants, amusing plants, or plants so easy to grow at home it would be mortifying to buy them. There are always some good garden standbys, or some particularly pleasing colors to be perpetuated by home-saved seed.

I can not be orderly or systematic about this work, there are too many temptations: the gifts of generous

friends, those insidious little advertisements on the back page of horticultural publications, and the lure of faraway places. Some things like white *Agapanthus* sound beautiful and unusual; *Amaryllis*, though they may only bloom in time to cheer my old age, are not to be resisted; *Strelitzia* possibly is even slower to reach maturity, but it is a frivolous game to watch the large seeds—only partially covered and barely moist—until one day the attraction of bottom heat draws out the stout root, causing it to grow incredibly fast and push up the seed still innocent of green. So I have experimented with greenhouse subjects, summer bulbs and tub plants, and most of all with shrubs, hardy perennials and bulbs. Here is an account of a few of these ventures.

In 1940 I saw an advertisement of shrub seeds from a well known English firm, and after considerable correspondence they came tightly packed in the oldest cigarette box, (tin at that time was rarer than gold and silver), and heavily insured against "loss through enemy action." From that old cigarette box have grown many species lilacs, *Sweginzowii*, *Wolfei*, *reflexa*—in England they call *Reflexa* *Yunnanensis* Rosea, so I was agreeably surprised to see an old friend when it bloomed last summer—a great diversity of cotoneasters, dwarf, tall, evergreen and deciduous some quite unknown to me, all apparently perfectly hardy. One species rose from China, *Davidiana*, very robust and completely covered in June with graceful clusters of little pink blossoms; two *Hypericum*s, *grandiflorus* and *Forrestii* only root-hardy, but bearing large showy flowers in August on new wood; *Hydrangea Sargentiae*, slow and definitely not hardy, but a lovely tub plant.

Other shrub seeds have come from Western Canada, more lilac species,

villosa, *oblata*, *juliana*; various flowering plums and cherries, and their relative *Prinsepia sinensis*. These are all very hardy, even tough.

I have used home-saved seeds to extend plantings of favorite shrubs like *Laburnum*, *Corylopsis spicata*, *Cotoneaster perpusilla*, *Azalea altaclarensis*. Most shrubs grow rather quickly and easily from seed, and make a very presentable appearance in four or five years. When sending to foreign countries for seeds of trees and shrubs an important permit is required, but those quick, efficient, kind people who preside over the U. S. Bureau of Entomology and Plant Quarantine, make it a pleasure, for once, to comply with a government regulation.

Some Peonies, not the usual garden hybrids, though very slow, are well worth growing from seed, for they are amusing, and rather rare and expensive to buy. I have worked with three kinds, *Mutan*, *lutea* and *Mlokosewitschii*. *Mutan* is the well known tree peony of gardens, I have never had seeds of the true species, but this is one plant of mixed origin which seems always to produce beautiful offspring. *Lutea* is the wild yellow tree peony of China, a small bush with fresh widely cleft, almost fernlike foliage, and pleasing, not very large cup-shaped flowers. *Mlokosewitschii* is a superb herbaceous species from the Caucasus, with bold, highly decorative, almost blue foliage, the large primrose yellow flowers open a month before the garden peonies. *Mlokosewitschii* and *lutea* devote their first year exclusively to making a large fleshy root, which should not suffer from extreme cold or too much dampness, for the first eighteen months they may well be handled in pots or seed pans, allowed to freeze lightly, and brought back to the greenhouse in March to enjoy a long season of cool slow growth. *Mutan* starts out in the

same way but is apt to be over optimistic, and break out into top growth during our usual January thaw, and when this happens it must be rushed in for protection. There are other good peony species, but I have not yet found seeds of them.

The botanical tulips are an education in patience. No matter at what season they are sown the seed will be dormant until it has experienced the cold winter, then on the first warm day in March, up comes a fragile cotyledon, bent double like a green hairpin, Brought into the protection of the greenhouse, the hairpins straighten into a sort of grass which withers away after several weeks, yet the next autumn, when the well dried containers are shaken out, there are the little bulbs ready to be planted and frozen again. The second season will bring only very slightly bigger green blades and bulbs, but the third year the foliage will suggest real tulip leaves, the bulbs will be a more respectable size and may be put into the cold frames to shift for themselves until they bloom at last, in six to eight years from the time they were first sown.

Lest I lose heart waiting for things like these, there are the quick and easy African bulbs, many of which will bloom from seed the second year, increase rapidly, and perform in the greenhouse as in a meadow with the minimum of care; *Sparaxis*, like a scentless freesia turned gaudy—orange and red for the most part—but with many subtle variations in shades of salmon, ashes of roses, to nearly white, and always with precise markings of yellow and black in the throat; the slender, discreet *Gladiolus tristis*, with its elusive night perfume; *Ornithogalum thyrsoides*, Chinchichee, which keeps in water almost indefinitely; and there are many others. I think some interesting things could be done with

a good strain of freesia seed, but have not tried it yet.

Tuberous rooted begonias are fascinating to grow from seed, and this is the way to have many types and colors at little expense, but it is a fussy and exacting business for which the propagating box is really indispensable. The individual seed is almost invisible, one scatters a pinch of amber-colored dust over a spongy surface of wet sphagnum into which it immediately disappears. At least one originator furnishes very clear cultural directions to which his seeds respond meticulously, and if the various steps are taken with care and at the right time, they will bloom beautifully and true to description in six months. In the autumn the tubers may be dried off and stored, and the second year most of them will produce bigger plants. Gloxinias are grown in exactly the same way.

In the Pacific northwest there is a cult for Primulas. Very high quality seeds of endless varieties and colors may be had there, and also much good advice to ensure quick germination and successful culture. I have to keep reminding myself that Primulas dislike the climate of Long Island in summer and will languish here unless the soil is very carefully prepared, the site well selected and arranged, and ample moisture always available. At present I can offer these attentions to only a small patch of Polyanthus and Acaulis.

Aquilegias are a collector's hobby—there is an endless diversity of form and color, from dwarfs a few inches high to stout clumps rising several feet; true species from America, Europe and Asia, and strains selected for some particular quality. Oddly enough some of the rarer kinds are more persistent than the common garden hybrids. *Akitensis*, a three or four inch dwarf with big bright blue flowers,

from the now famous Kurile Islands, *Flabellata alba*, from Japan, and *ecalcarata* carrying little bronze and gold tassels over maiden-hair foliage, are practically indestructible.

There are innumerable wild flowers to be naturalized in favorable situations, our own and those of distant lands; Iris species by the hundred, and clematis vines, bushes and trailers; several good daylilies, bloodroot, hepatica, trillium, cardinal flower, to name a very few. All these are best sown in the autumn and left out over the winter, but as I have not many sheltered nooks, plenty of field mice, and often not much seed, I put it in flats and seed pans, leave these to freeze in the cold but safe glass passage and in March bring them into the greenhouse for some extra pampering and closer observation.

Finally there are always some regular garden standbys, both perennial and annual to be started, some novelty to try, some specially pleasing color to be perpetuated through home-saved seed.

No greenhouse is necessary in order to grow most of the plants I have mentioned, but it reduces accidents and makes success surer. It is such a nice place to work in on a sunny January day, the temperature over sixty, snow outside and fresh air coming through the open ventilator. I think a sun porch with a radiator to ensure a night temperature of about forty, a sink with running water, a work table, and some place to keep soil, would have nearly the same advantages; much too can be done with cold frames, but less luxuriously.

With interesting work, a comfortable place to do it in, quite a lot is accomplished through the years; the grounds begin to look different, like a strong personality the influence of the greenhouse is permeating the place. Oyster Bay, L. I.

Yankee Treasure

CAROL JEAN GRIMSHAW

Before we even discovered the place a lively disrespectful hurricane . . . New England style . . . had given it a whirlwind once-over, tangling brush, up-roo'ing trees and tossing up giant jack-straw piles which became impenetrable as undergrowth forced its way through interwoven debris. Not a foot of soil had been cultivated and the cabin itself was the only evidence of man's presence. That, too, belonged to the woods for the frame was laid up of the largest hurricane victims and the panelled ceilings and walls inside were of knotty, random boards that sweat resin and smelled of pine.

Our first garden was a challenge and a gamble that soon developed into an eye-opening refresher course covering every trick, theory, tip and gardening superstition that either of us had ever overheard or practised.

One of the neatest problems that ever faced a gardener was what could and should be done regarding the care and handling of the remainder of our five acres of wilderness.

We considered and debated. Where to begin, what to attempt, what to save and what to discard, these were our topics of discussion and conjecture.

Before we reached a decision, more precipitate neighbors provided an object lesson. We watched their busy bulldozer shove back Nature's gentle contours into a plateau semblance; clay subsoil followed mellow top as hillocks were layered into depressions to achieve that city lot made-land effect. Stripping brush and young trees from his lot, another neighbor piled them to burn beneath a patriarchal oak. Today that oak is tall and spreads enormous limbs, but only half leaves out in

glory, the other half rears a gaunt skeleton, in stark testimonial.

Neither procedure suited us, but we decided then that our first step should be an inventory of our existing assets.

Assisted by the seed and nursery catalogs we have saved under "Garden Notes," armed with a layman's knowledge of plant species and fortified by a hodge-podge collection of nature magazines and gardening literature, we undertook our project.

A hobby was born full-fledged on our first trip of assessment, or exploration. We found a storm-crippled birch repudiating its former glamour girl existence by seeding the slope beneath its bent-down trunk with a colony of perfect young canoe birches, some already mature enough to lose their ruddy baby skin for the chalky white of adolescence.

Treasure was revealed in a lavish scattering of young pin oaks, when we gave them mental price tags according to height, trunk diameters and nursery valuations.

Clearing boundary we came upon a sweet white azalea that thrust its head from the surrounding vegetation and begged reprieve from brush-cutters.

Deeper in the woods, the children thrilled to discover a few "glove and mitten" trees whose pungent spotty grey bark and amusing foliage proclaimed them sassafras.

Our *pièce de résistance*, the white pine seedlings needed only careful inspection to reveal numerous specimens that could rival any purchased plantings with the slight encouragement of intelligent forest weeding.

Among smaller items which but for our treasure hunt system might have

been ignored are the luxuriant water-cress that blankets the overflow from spring to brook, the dignified austerity of cattails also stream born and the jaunty spikes of the white-petaled, yellow eyed sagittaria with its green spear-head leaves.

Spring shows us native blue flag, to me the bluest of all iris. It spreads a bold carpet of bright adder-tongue varying from high-headed giants whose tenancy outstrips our own to the brand new babies of the ever expanding perimeter.

Despite authoritative opinions our dog-tooth violets which make their own beds without advice or admonition, usurp every near-swamp pocket that edges the stream and thrive in the spongy bogs that are left by spring's high water, places where at any season a well sunk crowbar will produce a little well.

This year's singleton prize was a drooping white trillium, tall enough to need the full height of a peach basket for protection as we cut the nearby wild cherry and the elm suckers which seem to exist solely for the support of tent caterpillars.

Still we meet strangers in our woods. The first spring blooming bush is a sweet-barked swamp lover that wears a tiny yellow fringed blossom; it may be one of the witch hazel family or perhaps something known as spicebush.

In fall we have another puzzler with shiny oblong berries, snug against its limbs, but leaves that are lobular with none of holly's points.

With a family weakness for nuts, from peanuts to pecans, we cherish a few shrubs (or young trees) with clustered nut formations but the little catkins that appear in the fall lead us to suspect that our trees may be beeches. Anxiously, we await the arrival of the tree identification book of the American

Forestry Association which promises expert assistance.

Beneath and among the various trees and bushes we discover fiddle heads and sweet fern, white violets and many types of blue and purple ones, wind-flowers and rue anemone, wild roses and strawberries, partridge berry and wintergreen berries.

On the slope behind the cabin we carefully skirt the glossy green of bottle gentians, to enjoy their soft deep blue in early September. We make daily trips to watch the bees as they go from one closed bloom to another and paw them open just enough to get front feet and head inside, then buzzing their motors up to a maximum, shoot all the way in.

If luckily the light is right you may watch the busy pollenizer as he pushes down to the very bottom, completes a few gyrating capers within and emerges triumphantly.

Another pride and joy was right in our dooryard too, but who could smell the sweetness of baberry leaves without searching the source? We watched the bushes with misgiving, for no berries came at first and we were starting inquiries about distinguishing batchelor boys from batchelor girls (that we might supply the missing sex) when this year berries appeared.

Blueberries, wild blackberries and raspberries, grapes and elderberries are fruity and fragrant, and if we never use these fruits ourselves they are well worth their keep in bringing us birds that are interesting and beautiful for our winter entertainment and prove useful assistants in our summer battle against garden insects.

Yes, our scheme of developing a place is slow with none of the spectacular elements of the clean-sweep clearing method and none of the precision of the neatly barbered, carefully

spaced professional landscaping, but as a source of year round enjoyment for every member of the family it is unrivaled. Children take a greater interest in plants they have helped to discover than they would in nursery imports. There is a deep, growing satisfaction in making the acquaintance of the natural bounties of your home.

If, finally, the time arrives when you have plumbed your native resources and the introduction of some desirable outsiders amid the original plant friends is indicated, you will find that this apprenticeship to Nature has equipped you with a fine knowledge to guide

your selections. You have become familiar with the tribal habits of many plant families and know which ones thrive in your soil. You are aware of exposed and sheltered situations and have a valuable appreciation of the contour of the land, its drainage problems and the depth and fertility of the soil. At this time it is safe to indulge in the most expensive luxury item that you might wish to add to your home grounds . . . if you still want to add a fillip or flourish to the inherent wealth that your nature treasure hunt has uncovered.

East Hartford, Conn.

Boöphone and Brunsvigia

L. S. HANNIBAL

The Amaryllids from South Africa are probably the most diversified as well as interesting examples of the bulb kingdom available, but many of them are not well known, and only a very few have been seen in this country to date. *Boöphone disticha* (Syn *Buphane disticha*) is thus new to us, but according to reports it is very wide spread through Natal, Transvaal, and the Cape area where it grows in rocky outcroppings in the grassland areas.

During the rainy seasons a score of leaves some 1" wide by 18" long appear in a distinct fan-shaped formation, whence comes the name from the distichous appearance. After the annual leaf growth the bulb goes into a summer dormant rest not unlike an *Amaryllis belladonna*, only to throw a short stiff scape in the fall with a mass of blood red flowers (see plate).

To be seen in flower the amateur botanist would consider the bulb related to an entirely different genera of plants, namely *Haemanthus*, and for that reason it was first described as

Haemanthus toxicarius by Thunberg. Herbert in his "Amaryllidaceae" recognized that it was not a *Haemanthus*, so assigned the name *Buphane*, meaning "Cattle killer," but Milne-Redhead of the Kew gardens suggests the above *Boöphone*¹ is more likely correct if we examine the derivation of the word from the Greek roots.

In the South African velt the *Böophone disticha* is a serious problem to cattle growers as it is deadly poison, producing a maddening condition. In turn the natives use the sap to tip their arrows, which meant death to many an early explorer. Locally it is called "Gifbol" meaning several poisonous bulb.

There are several other members to this Genus, which are also poisonous. *B. ciliaris* is to be found in the Cape area. It throws four or five tongue shaped leaves that are edged with a black hair or cilia. According to reports it rarely flowers unless a grass fire sweeps the velt. Then the blossoms

¹See Milne-Redhead's footnote in "The Genus *Ammocharis*," Jour. Linn. Soc., Vol. 52, P. 162, (1939).

will appear in the fall by the thousands.

The least known species is *B. longepedicellata* Pax (1889) which is still a stranger here.

All of the *Boöphone* flower with the individual blossoms on relative short pedicels, excluding the last mentioned. As the fruit begin to ripen with their single seed the pedicels elongate 5 or 6 inches, making a large umbel of pods. Dean Herbert described the pods as winged, which was not properly understood by the writer—In the modern sense he should have stated that the fruit (pods) had peaked shoulders not unlike a "Root-Suit." It is quite a distinct characteristic. A mature umbel may be noted in the second plate with the *Brunsvigia*.

The Genus *Brunsvigia* is still little known, and in considerable confusion. It too is a South African bulb group belonging to the same tribe as *Boöphone*. Both Linnaeus and Heister described subspecies in 1753. Linnaeus called his *Amaryllis orientalis*, and Heister, his *Brunsvigia gigantea*. The enclosed plate is the latter form, which grows with a taller scape and has pointed lingulate leaves, whereas the *orientalis* leaf is slightly more oval. However the differences are small. One is the subspecies of the other.

Like *Boöphone*, or *Amaryllis belladonna* the *Brunsvigias* grow their foliage in the winter, and flower in the late fall with a bare scape. Most of them grow in the open or under slight brush where conditions are well drained. Of the recumbent, lingulate-leaved group, the plant illustrated is the largest. There are several other members to this subgenera with smaller bulbs from the size of a man's fist to the size of a hazel nut, but the common characteristic throughout is the 4 or 5 leaves that lie prone upon the ground where they can catch the slightest trace of dew in their cupped surfaces.

Brunsvigia cooperi is one of these. It is much like *gigantea*, but grows in the high meadows, so it is far hardier to mild frosts than *gigantea*. In fact it has been grown in the open in southern England, and it does well about the San Francisco Bay area.

B. minor Lindl., *B. striata* Aiton, *B. radula* Aiton, and *B. raduolosa* Herbert are all dwarf members to *gigantea* with small spreading leaves. *Striata* makes an interesting pot plant and has a root system several feet long, which is all out of proportion to the thimble sized bulb. *B. Natalensis* and *appendiculata*, only recently described, are intermediate in size. The flowers of all of these are more or less characteristic of those shown in the umbel, having the characteristic upward turn on the ovary.

Brunsvigia Josephinae (syn *B. gigantea* Van Marum, 1805) is probably best known and is the typical example of the lorate, upright, multiple-leaf group, or subgenus as the case may be. There are many features that differ from the *Brunsvigias* above. The plants have 8 to 14 leaves which arrange themselves in a didtichous manner as the *Boöphone* so named. These are lorate in shape and bear a waxy coat that sheds water as a duck. In turn, the blossoms and fruit are shaped differently from *Orientalis*. Possibly not so much with *B. Josephinae* as with *B. grandiflora* Lindl., *B. Slateriana* Benth., and *B. undulata* Leighton.

Brunsvigia Josephinae has been widely grown in England for years under glass, and *B. Slateriana*, which resembles a giant *Nerine Bowdeni* when in flower is particularly choice. Neither of these are particularly difficult to handle in large pots, or even in the open about Los Angeles. *B. grandiflora* Lindl. is not unlike *Slateriana*, but it is not known in this country. However its hybrids with *Amaryllis*



Grant Wallace

Brunsvigia gigantea Heister (left) with seed umbel of *Boöphone* in corner;
Boöphone disticha, Herbert (right).

belladonna, known as the "*Brunsvigia Multifloras*" have been grown in Australia some 90 years, and these do excellently in central California and South, so presumably *Grandiflora* would.

B. undulata is not known here, but recently the writer imported an undescribed (?) species from Natal which upset all concepts of winter growth habits. This plant throws its foliage during the summer and rests in the winter, which is contrary to expectations, and all descriptions of the habits of *Brunsvigias*. Miss Leighton has re-

ported unofficially from the Cape that she considered it a form of *Slateriana*. If so, it is a sub-tropical variant of an attractive plant, and it is unfortunate that we have so much difficulty with it here.

Finally we have the *Multiflora* hybrids mentioned above, which are not unlike the *Brunsdonnas* (*Amaryllis belladonna* × *Brunsvigia Josephinae* Hybrids). Both of these groups are attractive, but to the writer the finest of the Hybrids are the white *Multiflora albas*, which should be better known as stocks become available.

Cascade Palms in Southern Mexico

O. F. COOK

The southern districts of Mexico, between the Isthmus of Tehuantepec and the borders of Guatemala, usually are reckoned geographically as belonging to Central America, or "Middle America," if this expression be preferred. Much of the country is mountainous, and palms are more abundant in the mountain forests than in the lowlands. The Central American palm flora is relatively rich and varied, with many forms remarkably localized. Three series or floral elements may be distinguished in Central America when questions of affinity and geographic distribution are considered among the palms. One series finds its affinities in South America, and is largely confined to the tropical lowlands, while another series is related to groups that are centered in northern Mexico. The palms that form the third series appear to be truly indigenous, with a notable wealth of localized forms, especially among those referred traditionally to the genus *Chamaedorea*, now recognized as a diversified family, Chamaedoreaceae.

This group is known popularly in Guatemala and other Central American countries as "pacaya palms," a name having reference primarily to the use of the succulent male inflorescences as a vegetable or salad food. The edible inflorescences, in their natural wrappings of husk-like spathes, having much resemblance to ears of maize, often are collected in commercial quantities and sold in the public markets of Coban and other table-land cities in eastern Guatemala, as described and illustrated in the NATIONAL HORTICULTURAL MAGAZINE for July 1939, "The Edible Pacaya Palm of Alta Vera Paz." This useful pacaya palm is most abundant

in the coffee-growing district of Coban, and is one of the largest members of the *Chamaedorea* group, with trunks often attaining 20 feet in height and exceeding 3 inches in diameter. Most of its relatives are much smaller palms, with only slender trunks, the size of canes, pencils or quills, and some have their trunks reduced to creeping root-stocks.

Another interest attaches to some of the smaller pacaya palms on account of being adapted to cultivation as house-plants, with notable tolerance of shade, dry atmosphere and moderate temperatures, as usually encountered under living-room conditions, in ordinary dwelling-houses. One of these "household palms" has thrived for more than 40 years in a Maryland farm-house, flowering, fruiting and germinating with no special care except pollination, the sexes being separate. An illustrated account of this palm appeared in the NATIONAL HORTICULTURAL MAGAZINE for January 1938, "A Diminutive Palm from Maya Land." Several other pacaya palms with similar habits of living in nature as undergrowth, and showing similar tolerance of household conditions, yet widely different in appearance and in floral characters, were described and figured in the NATIONAL HORTICULTURAL MAGAZINE for July and October 1943 "Household Palms and Related Genera."

Plants that can thrive in our living-rooms may bring us rich satisfactions as yet but little appreciated, in serving as vivid reminders of congenial places in other parts of the world. Even a familiar species, as *Saxifraga sarmen-tosa*, the Chinese saxifrage or "beef-steak plant," takes on a new charm



Fig. 1. Male Vadia palm, flowering, reduced to one-quarter.

and distinction after one has seen it growing wild on the summits of Lushan, in central China. It is pleasant to reflect that in a few years the palm world of the mountain forests of Central America may be readily accessible by motor or air-plane. No other tropical region has greater attractions of climate, landscape, plant-life, human interest, as the region that generated the ancient Mayan civilization. To equip ourselves for recognizing our plants in the field is the first stage of effective study and appreciation of the tropical world.

New Habits of Cascade Palms

The palms made known in the present paper, although of small size and able to grow as potted plants under living-room conditions, are not closely related to those previously described as household palms, but are shown by their inflorescences and flowers to have much greater affinity with the genus *Edanthe*, the palms that produce the edible pacayas. In other respects there is little similarity. The cascade palms are among the smallest members of the group instead of the largest, and the plant body, instead of being represented by an upright jointed trunk, is restricted to a horizontal creeping root-stock. Among the distinctive features of the new type are its adaptation to a special habitat or place in nature, a departure from the habits of the other small palms that root in the forest leaf mold, and an approximation to the habits of various aquatic plants that grow in the rocky beds of the mountain streams. A wider range of conditions and possibilities of adaptation needs to be recognized in the event of a general search being made for household palms. Not only the wooded slopes of the Central American mountains will need to be explored, but the ravines, water-courses and stream-beds may also give protec-

tion to species that can serve as houseplants, or in tropical countries may be of use for ornamental planting, in fountains, cascades or water-falls.

Instead of the slender reed-like trunks produced by most of the palms of the *Chamaedorea* family, these palms that grow in cascading mountain torrents have the trunks reduced to short-jointed creeping rootstocks anchored by many interlacing roots to the rocks of the stream-bed. In periods of heavy rain, when no doubt the entire plant is submerged in the rapid current, a rigid upright trunk would increase the danger of being broken or uprooted, or at least of the foliage being whipped and shredded.

A Name for the New Palm

The generic name *Vadia* is suggested for the new palm in allusion to its being adapted to stream-bed conditions, with alternating periods of immersion and partial exposure, or even to long exposure in dry seasons. The word *Vadia*, a Latin cognate of our English *wade*, carries the suggestion of a palm living in shallow water. A copious formation of roots in *Vadia* may be seen as a first qualification for holding to the stones, in the swift currents. Even in greenhouse plants the roots often grew through the pots and ranged widely in the soil underneath.

The roots are rather coarse, about 3 mm. thick with relatively few branches attaining 2 mm., but abundant fine threadlike branches, not noted in other palms of this group. With such roots forming cushions on the rocks, more soil and moisture would be held than would be possible for a plant with a limited root system. Other examples of adaptively specialized root formations have been recognized in *Simpsonia*, a fan palm of the Florida keys, and also in the related genus *Oothinax* in Haiti, in these cases the roots form-



Fig. 2. Vadia palm with twin inflorescences, natural size.

ing masses of spongy material for holding rain-water.

The extent of specialization involved in this adaptation to stream-bed conditions may be considered in detail by comparing figures 1 and 2, showing the compact short-jointed root-stocks of the new palm, with figure 10, where erect long-jointed reed-like trunks are shown in *Mauranthe lunata*. Figure 10 shows also the amply branched inflorescences in both sexes developed in thrifty plants of *Mauranthe*, in the same greenhouse as the plant of *Vadia* shown in figures 1 and 2. Inflorescences of *Vadia* are shown in natural size in figures 6, 7, and 8, which should be compared with those of the edible pacaya, and especially with figures 3 and 7 of the paper published in 1939, noting essential agreements in floral structure and arrangement in both sexes.

From the foliage of *Vadia*, as shown in figures 1, 3, and 5 of the present paper a close alliance with the *Neanthe* palm might be expected, as may be seen from figures of *Neanthe* in the NATIONAL HORTICULTURAL MAGAZINE of January 1938, but ample details of the flowers of *Neanthe* are reproduced in that paper, and will leave no reader in doubt that the palms are specialized on widely divergent lines. In addition to their structural differences, the male flowers of *Neanthe* are arranged in two rows and widely separated along the branches, while those of *Vadia* are in four rows and fitted together in a continuous pavement.

Occasion of Finding the Cascade Palm

Studies of *Neanthe* and other native palms of Alta Vera Paz in eastern Guatemala had been made in 1902, when coffee and rubber were being investigated and the discovery in that district of an insect enemy of the cotton boll-weevil in 1904 occasioned further

visits to Central America to obtain information regarding protection against the boll-weevil. The expedition of 1906 extended across Guatemala, by way of Salama, Rabinal, Quiche, Totonicapan to Quetzaltenango, Huehuetenango, Jacaltenango and Nenton, then Comitán in southern Mexico and northward across Chiapas, through Ocosingo, Tumbala, and Salto de Agua, to Frontera, Campeche and Mérida. The visit to Ocosingo afforded the first contact with an outstanding new native type of cotton, grown in a neighboring tableland district of Chiapas, a type that proved adapted to conditions in the United States, and later was grown extensively. An account of these explorations was published by the Department of Agriculture in 1927, "Acala Cotton, a Superior Upland Variety from Southern Mexico," including a small map. Mr. B. T. Jordan of Victoria, Texas, at that time a field assistant in the Bureau of Plant Industry, U. S. Department of Agriculture, was my companion in 1906.

Ocosingo is about 50 miles southwest of Palenque, in a region well known to archaeologists for its ancient Maya cities, many of them described by Stevens and Calderwood in 1841, in the second volume of "Incidents of Travel in Central America, Chiapas and Yucatan." The country between Ocosingo and Palenque is reported by Stevens and Calderwood as extremely broken and difficult, "across mountains and precipices," where the mountain streams are broken into many cascades "peculiar in beauty."

The new palm was found on June 18, 1906, a few miles after leaving Ocosingo in a northwesterly direction, on the road toward Bachajon, Chilon and El Salto, in the bed of a mountain torrent. Many mountain streams had been crossed in this and other journeys in Central America without finding

such palms. The rainy season had begun, and no extended search could be made to determine the range or abundance of the new form, but no other specimens were seen in crossing the range of mountains between Ocosingo and El Salto. Several larger palms of the *Chamaedorea* family were found, most of them closely similar to the species studied previously in Alta Vera Paz. The scarcity of surface streams in the cavernous mountains of Alta Vera Paz might explain an absence of aquatic palms.

The stream where the palms grew was known as Jotola, a name that may be taken as a version of a Maya expression *hootolha*, meaning water on an incline, oblique or "sloping" water. Many of the mountain streams form successions of cascades, so that the expression "cascade palm" may serve as a reminder of the native habitat. Several of the palms were found to be fruiting, all with small, simple inflorescences, and the seeds immature. A few living plants were brought home by the method of rolling in oiled paper, with the package tied above the roots but left open above the leaves, as previously used with *Neanthe* and *Omanthe*. The plants survived the return journey by way of Frontera, Campeche, Mérida, and New York, and later showed their ability to thrive with the other household palms under living-room conditions. The specific name *Vadia jotolana* is suggested for the type species, in reference to the cascade habitat and the locality where the palm was discovered.

Form and Color

The lack of an erect symmetrical form may render *Vadia* of less interest than the other household palms for growing by itself, unless the graceful outlines and intensive colors of the foliage should prove attractive. The

potted plants, as in figures 1, 2, and 7, if seen by themselves, might not be taken for palms, but the contrasts with palms of other forms may be very pleasing. Luxuriant greenhouse plants of *Vadia*, as shown in figure 1, may reach a height of two or three feet, while on reduced household plants the leaves may be only 6 or 7 inches long, as in the small leaf-blade shown at the left of figure 5, with the rachis only half as thick as on leaves of thriving greenhouse plants shown in comparison.

Leaves of small household plants may have only 6 or 7 pinnae on a side while large luxuriant leaves may have 16 or 17 pinnae on a side. The terminal bud subdivides, so that in a few years a many-headed plant is formed, as in figure 7. A larger plant was formed in the course of three seasons from the single head shown in figure 1, photographed in February 1943. In the spring of 1946 this plant had developed 6 heads, each with 3 to 5 leaves. The leaves individually are very graceful and form a cluster much more attractive than appears from a photograph, on account of vivid emerald color and the smooth shining surfaces of the pinnae, giving a notable impression of freshness and vigor. The petioles and leaf-sheaths, and the spathes of the young inflorescences are of the same deep green color, but lighter near the base. A root-stock exposed to the light is crossed with narrow bands of green, some of the joints having a length of 2 or 3 mm. between the leaf-scars.

Leaf-Sheaths Curved and Bulbous

Two unusual characters appear in *Vadia* as consequences of the replacement of an upright trunk by a short-jointed horizontal root-stock. The leaf-sheath bundle is not straight and cylindrical as in the many kinds of palms that stand erect, but is notably curved

and thickened in the basal part, as shown in natural size in figure 2. The lateral view of the plant in figure 1 shows the extent of curvature required to bring the young leaves and inflorescences into upright positions.

The rather abrupt thickening of the leaf-sheaths at the base, shown especially in figure 2, doubtless serves to resist the strains of the swift currents during periods of high water. No such swelling of the leaf-sheaths occurs in the related palms that retain the usual reed-like habit, as in *Mauranthe lunata*, shown in figure 10. The swollen bases of the leaf-sheaths are of notably succulent texture and do not persist on moribund leaves, but tend to shrivel as soon as a mature leaf-blade turns yellow.

Petiole and Rachis

The petiole of a fully mature leaf from a greenhouse plant at Beltsville, Maryland, November 1944, was 16.5 cm. long, with strong lateral compression, in the lower part 3 mm. wide, 5 mm. thick, in upper part 2.5 mm. by 4.5 mm.; the upper face with two fine parallel ridges about 1.5 mm. apart, decurrent from the lowest pinnae; the median band between the ridges moderately convex in the lower part gradually becoming concave; lateral faces distinctly grooved, on one side more strongly than the other; the lower face largely occupied by a prominent pale vitta bordered on each side by a narrow green band between two parallel fine grooves, with other green bands more or less distinct. The vitta is greenish yellow finely dotted or mottled with greenish along the sides.

The rachis also has the vitta distinct and separated by distinct grooves, the lateral green bands broader than the vitta in the lower part of the rachis, narrower in the upper part. The surface of the vitta is broadly prominent

in the lower part of the rachis, even or slightly depressed in the upper part. The upper side of the rachis is marked with a fine median ridge, continuous and mostly free, but often partly occupied by the bases of the pinnae. The ridge is much stronger in the lower part of the leaf, and the surface rather densely beset with minute tubercles or caruncles, also the neighboring surfaces of the rachis and the bases of the pinnae, especially along the midrib.

The rachis is semicylindric, nearly flat above, with a narrow median flange giving support to the oblique attachments of the pinnae. Lower surface of rachis evenly convex except as marked by slight longitudinal grooves on each side of the vitta or median band of indurated tissue which in many related palms is white or pale green in contrast with the surfaces on either side. The vitta in *Vadia* usually is green, but the grooves distinct, as in natural-size photograph at the right of figure 5. On the rachis of the small leaf at the left of figure 5, the grooves do not show, but a slight difference in color may be perceived. The vitta as a compact band of indurated fibers doubtless is present in all the members of the group, but may be concealed by a green epidermal layer.

From later observations on living leaves it appears that the compression of the petiole and the grooving of the surface are to be considered as effect of shrinkage, although sometimes taking place while the tissues are still alive. The upper part of the petiole in a fully fresh condition may show a rounded triangular cross-section 5 mm. thick and nearly as wide, the upper surface with a flat median band less than 2 mm. wide slightly raised above the surface, bordered on each side by a fine raised line and a slight groove, the lines marked by the absence of the stomata, elsewhere abundant on the surface, in-

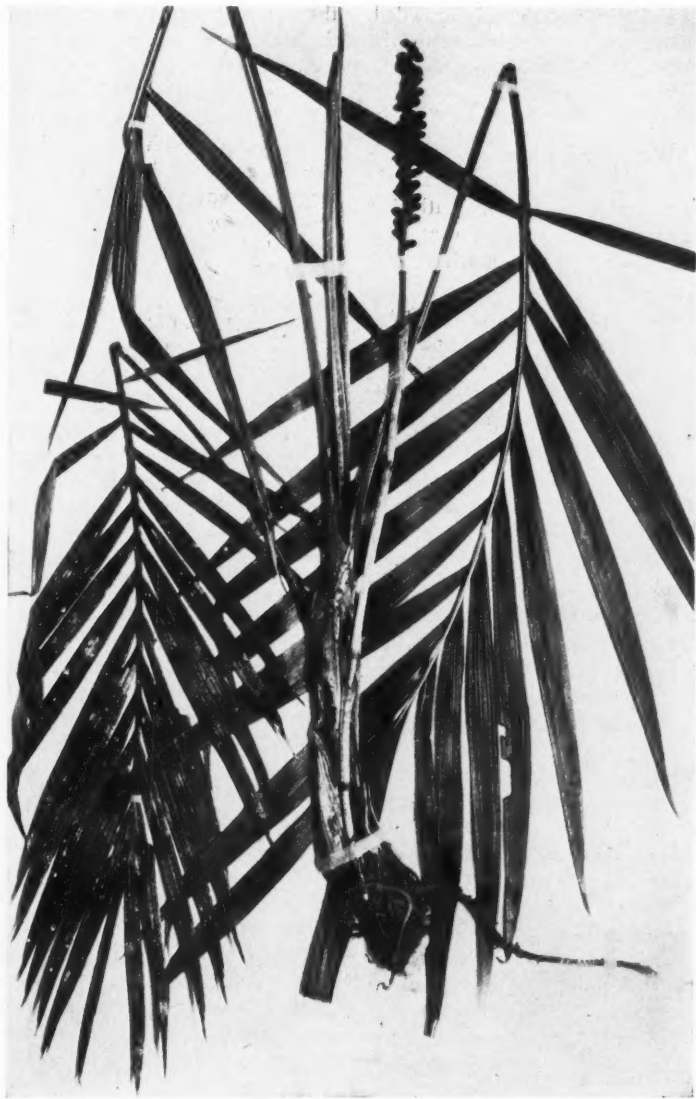


Fig. 3. *Vadia* palm, type specimen, female.

cluding the median band. The lower side of the petiole often has several longitudinal grooves or wrinkles on either side of the vitta, more numerous in the lower part of the petiole and on

the leaf-sheath. Stomata are absent along the vitta and also on the light-colored tissue of the basal callus of the pinnae, as well as from the veins. The stomata between the veins of the pinnae

are more minute and densely crowded, but stomata are not perceptible on the upper surface of the pinnae.

Curved Attachment of Pinnae

The pinnae are linear, the upper surface flat, even the midvein scarcely prominent, but distinct underneath, and also the submarginal veins, these not close to the margin but much farther from the midvein. The insertion of the pinnae of *Vadia* is peculiar. The lower margin of the pinna, instead of meeting the rachis directly, passes above the rachis nearly to the median ridge, forming a broad curve or angle, and then returning obliquely to meet the margin of the rachis, so that the upper surface is turned under and the lower surface becomes visible inside the curve, as shown in figure 5. The lower margin of the pinna remains free until the margin of the rachis is reached. This mode of attachment of the pinnae is in marked contrast with *Neanthe* where the lower margin remains straight to near the base, and there is curved abruptly forward so that a sharp angle or notch is formed in reaching the point of attachment to the margin of the rachis. The pinnae of *Neanthe* are gradually narrowed and at the base abruptly narrowed, with the base as a whole in the nature of a pulvinus, while in *Vadia* the pulvinus appears to be confined to the part of the base above the midrib, where the thickening is greater, but the attachment of the lower part of the pinna is much longer, in being decurrent upon the rachis, and is turned obliquely sideways, though not reaching the margin of the rachis, which forms a sharp angle, in the lower part minutely notched, tuberculate or carunculate like the neighboring surfaces. The slight development of the pulvinus may explain why the pinnae of *Vadia* do not have

the marked tendency to separate in drying, shown in some of the related forms.

Length of rachis 31.5 cm., of entire leaf-blade with terminal pinnae 42 cm., 17 pinnae on each side. Lowest pinnae 10 cm. long by 6 mm., gradually larger to above the middle of the leaf; tenth pinnae 17 cm. by 12 mm.; fifteenth pinnae 13.5 cm. by 9 mm.; penultimate pinnae 12.5 cm. by 6-7 mm.; last pinnae 11 cm. by 8 mm.

The midrib of the pinnae is marked on the upper side by a distinct ridge, the other veins by minute ridges set in fine grooves. The three prominent veins are transparent by transmitted light, the others indistinct. A fine submarginal vein is perceptible near the upper margin of the pinnae, but not along the lower margin. The lower pinnae are alternate, the upper opposite, on this leaf. In figure 5 the small leaf shows alternate pinnae, the large leaf nearly opposite pinnae. The general shape of the leaf-blade is oblong or oboval, the lower pinnae shorter and narrower than the upper; terminal pinnae scarcely shortened or widened, in this respect markedly contrasting with those of *Neanthe*. The texture of the pinnae appears uniform by transmitted light, somewhat mottled and with lighter areas, but not the short longitudinal lines observed in some of the related forms.

Leaves of the luxuriant greenhouse plant at Beltsville, with the rachis attaining 38 cm., the petiole 27 cm., the basal sheath 16 cm., back of rachis and petiole with a rather narrow pale green vitta, not distinct on the leaf-sheath. Lower pinnae little reduced, fifth pinnae 21 to 22 cm. long, 1.2 to 1.4 cm. wide; subterminal pinnae usually 17 cm. by 1.1 to 1.4 cm., ranging from 6 mm. to 22 mm. in width, the inner margin of last pinnae 12 to 13 cm. long.

Petiole often distinctly flattened on



Fig. 4. *Lobelia palm*, type specimens, reduced, natural, magnified.

the sides and notably narrower than the rachis. Lower part of rachis more than 5 mm. wide, the petiole less than 4 mm. in lateral width, 6 mm. in vertical width, upper side of petiole flat,

becoming slightly channeled below, then deeply channeled. The lower side may be evenly rounded or flattened, rather sharply angled at each side of the vitta.

The Type Specimen of Vadia

Growing in the bed of a mountain torrent between Ocosingo and Jotola, El Salto de Agua, Chiapas, Mexico, June 18, 1906, number 127, shown as a pressed herbarium specimen in Figure 3.

Rootstock 1.5 cm. in diameter in the dry state, joints very short, often less than one millimeter between the scars of the leaf-sheaths. Leaf of female plant with blade nearly 30 cm. long, petiole about 16 cm., the leaf sheath 13 cm. long, open for four to five cm., to near to the base in an older leaf. Ten pinnae on a side, lowest 12 cm. by 8 mm., fifth pinnae 16 cm. by 10 mm., penultimate pinnae 12.5 cm. by 7 mm., last pinnae 13 cm. by 9 mm., another leaf much smaller.

Peduncle 20 cm. long, first joint 2 mm. long by 12 mm., widely amplexicaul, second joint 5 mm. by 3 mm., third joint 31 mm. by less than 3 mm., fourth joint 4 cm. long, fifth joint 5 cm. long, sixth joint 4.8 cm., seventh 3 cm., axis 6.5 cm. Spathe of 3rd joint 3.4 cm. long, leaving 7 mm. of fourth joint exposed; spathe of fourth joint 6 cm. long, of fifth joint nearly 6 cm. long. Only five spathes, the sixth joint with a membranous ring 1 to 2 mm. long.

Since the third spathe is not as long as the fourth section of the peduncle, a part of the fourth section often is left exposed, a feature not observed in other forms, and possibly to be interpreted as a tendency to reduction of the lower spathes while the upper spathes may be supposed to have had a compensating enlargement, at least in the male sex.

A Contrasting Leaf-Pattern in Lobia

The extent of specialization in the leaf-pattern of *Vadia* may be appreciated by way of contrast with another

little-known type described but not illustrated in the NHM in October 1943, page 148, under the name *Lobia*. This is another Central American palm that appears to be specialized for shade and moisture conditions, but obviously on divergent lines. Even in dry specimens of the foliage of *Vadia* as shown in Fig. 3 the streamlined tendency is evident, in marked contrast with the foliage of *Lobia*, shown in Figure 4. Thus from the leaf form it may be inferred that *Lobia* is not adapted to conditions of submergence, although extremes of atmospheric humidity are suggested by the delicate texture and open port of the pinnae, which also are more widely separated on the rachis than those of *Vadia*, as well as more divergent.

The minute basal lobes or auricles of the pinnae in *Lobia*, projecting from the inferior angles of the pinnae, obliquely transverse to the rachis, are a feature noted as yet in no other palm. The lobes of the third and fourth pinnae are shown in natural size in the upper right hand photograph of figure 4; below this an enlargement showing the bases of the third and fourth pinnae and the hispid pubescence most notable on the rachis. The minutely roughened surfaces of the rachis and adjacent leaf margins of *Lobia*, contrasting with the smooth surfaces of *Vadia*, raise the question of moisture being obtained by *Lobia* from spray or mist in periods of dry weather. Although the two palms are differently specialized, they might grow in adjacent places, where openings in the forest canopy are afforded by stream-beds or water courses in mountain districts.

The rather fleshy leaf texture of *Vadia* may be compared with that of many aquatic plants, while *Lobia* seems more delicately fern-like or moss-like, a character remarkable among palms as an opposite extreme of adaptation from the many that are specialized for

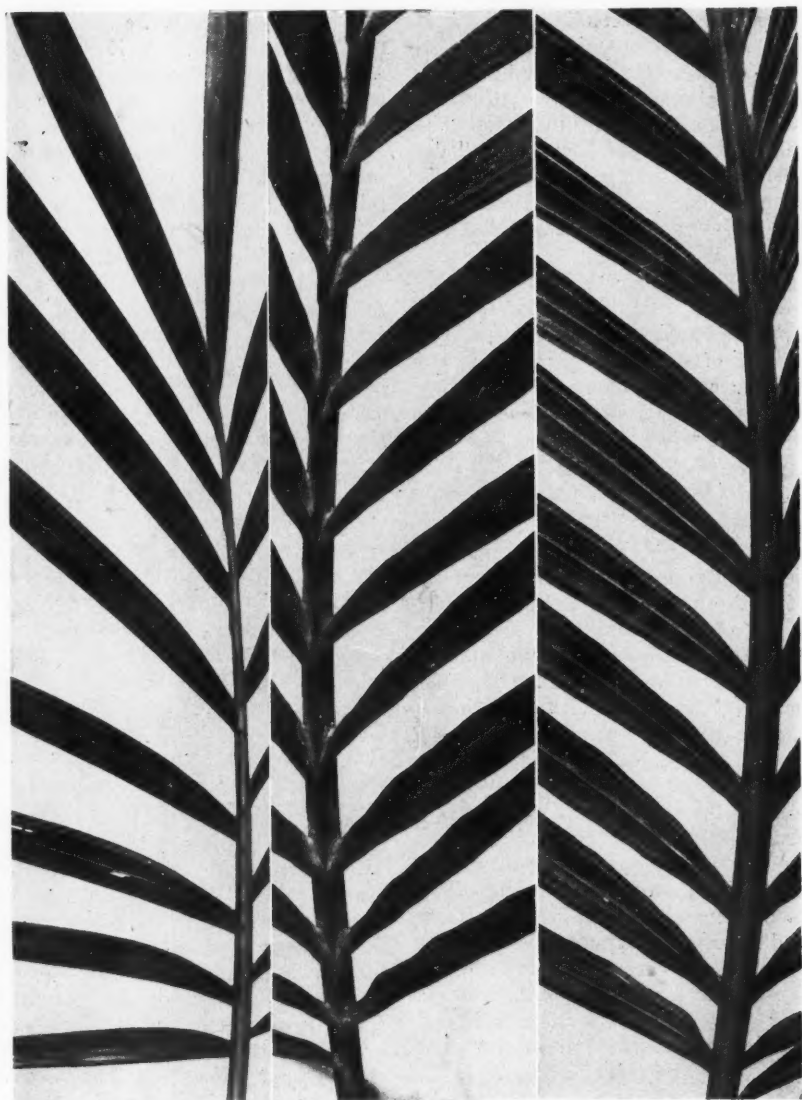


Fig. 5. Vadia palm, leaf structure, natural size.

deserts or other conditions of exposure as *Washingtonia*, *Jubaea*, and *Simpsonia*. Only the female flowers of *Lobia* are known, but these afford no indication of alliance with *Vadia*. The calyx of the female flower is well developed in *Lobia*, with large broadly rounded lobes, while in *Vadia* the calyx is reduced to a thin, narrow, oval rim often scarcely perceptible in the dry state. The petals of *Vadia* also appear to be shorter and thicker than those of *Lobia* and more strongly connate. The texture of the petals of *Vadia* is not fibrous, but in the dry state appears thickened and indurated, especially in the lower part.

Inflorescences Develop among the Leaves

The inflorescences of *Vadia* may be described as interfoliar, since they develop to a length of several inches while still inside the sheaths of the living leaves, but the fully developed inflorescences are infrafoliar, in the sense of being no longer included in the leaf-sheath bundle, as shown in figures 1 and 2. Nevertheless, the inflorescences are closely adjacent to the leaves, the leaf-sheaths that subtend the inflorescences being only recently dead or still moribund at the time of flowering, thus suggesting that the development of the inflorescences may occasion the wilting and decay of the mature leaves. On account of the succulent texture of the leaf-sheaths a rather prompt shrinkage and shriveling occurs. The moribund leaves were removed from the plant that was photographed as figure 1.

Spathes and Peduncles

A male plant in a greenhouse at Beltsville, Maryland, flowers each year in February and March. On February 23, 1943, one inflorescence was open, two were well-advanced, and one was beginning to emerge from the leaf-

sheath, as shown in figure 1. The mature inflorescence, with 15 branches, was about 47 cm. long, the axis 7 cm., the lower branches 11 cm., the upper 8 cm. Six spathes are exposed, the lowest about 2 cm. long, the second projecting 2 cm. beyond the first, the third 3 cm., the fourth 8 cm., the fifth 13 cm., the sixth 10 cm., the last spathes nearly complete, fusiform, with a cylindrical section nearly 2 cm. in diameter, the slender beak 5 to 6 cm. long, projecting in the young inflorescences beyond the swelling formed by the tassel of branches inside. The young inflorescences are colored like the young leaf, a much deeper green than at maturity.

The spathes are of succulent fleshy texture, the lower still green and fleshy at the flowering stage, but the upper yellowish and somewhat flabby, although the flowers still appear rather fresh. The size, shape and texture of spathes confirm the alliance with *Edanthe* and other genera having tessellate flowers, and the texture of the foliage also points to this association. The narrow pinnae are in contrast with *Edanthe* but the prominent veins in agreement. The fleshy, elastic texture of the male inflorescence is another consistent feature.

An inflorescence may have only five spathes exposed in the earlier stages of development, the sixth spathe sometimes emerging rather late or projecting but little beyond the fifth, depending upon the growth of the peduncle. Color of male peduncle and axis pale green, not white as in *Edanthe*. Basal spathes and subtending leaf sheaths turning yellowish at time of flowering, the leaf yellowing and the leaf-sheaths dying back rather rapidly after the petiole and blades are removed, but the decaying leaf tissues do not blacken as in *Edanthe*, nor like the flowers of *Mauranthe*.

Male inflorescence branches more or

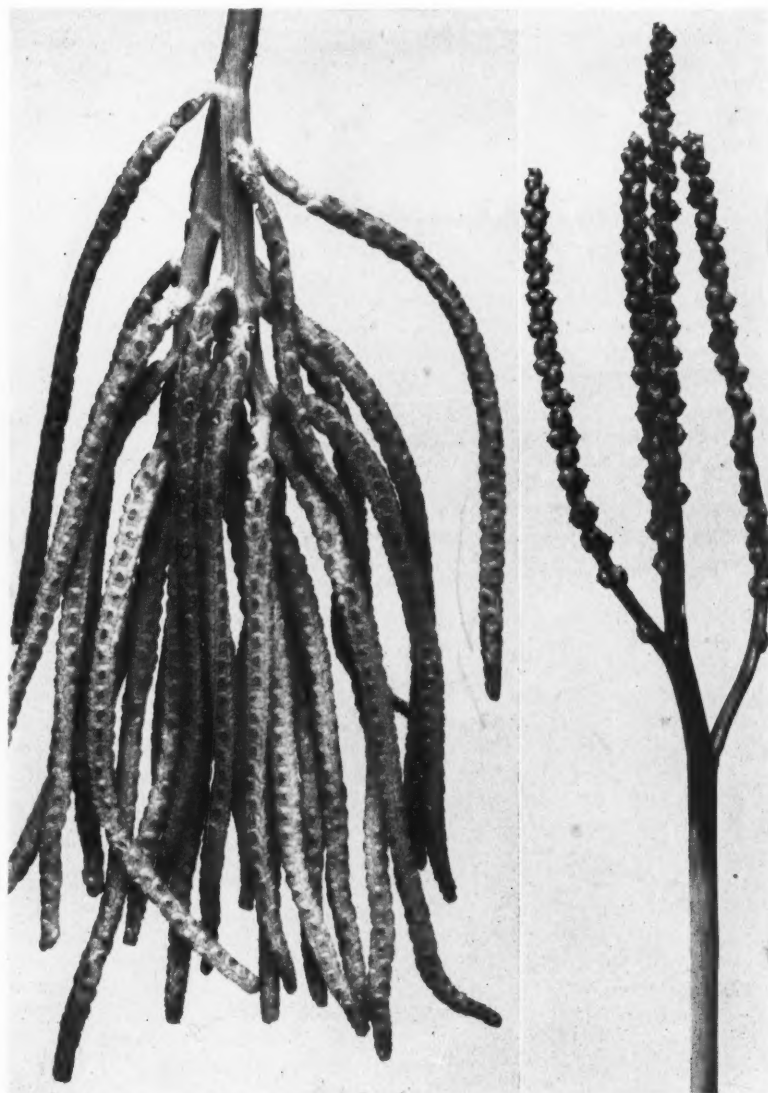


Fig. 6. *Vadia* palm, male and female inflorescences, natural size.

less quadrangular, with the flowers in four rows, a few of the lower flowers on the outer face of a branch often separate or irregular. Lower branches with no flowers in the axils, the naked area one cm. or less in length, but the other three sides with flowers. No trace of bracts subtending the branches, but the articulation is distinct, the branches not adnate or decurrent, with scarcely any development of an axillary pulvinus, yet the lower branches becoming distinctly divergent or reflexed.

Twinning and Branching of Inflorescences

Not only the root-stocks are forked, but the same tendency to dichotomous division may be recognized in twin inflorescences emerging from the same basal spathes, as shown in figure 2, and in the formation of a double male inflorescence, reproduced in figure 6. The plant shown in figure 2 is the same as in figure 1, but a year later, in February 1944, after the leaves and inflorescences of the previous year had been entirely replaced. The slight vertical ridge running nearly parallel to the margin of the leaf sheath may have been occasioned by pressure in the separation of the terminal buds.

The double inflorescence when fully expanded had a length of nearly 60 cm., the peduncle 45 cm., the axis 6 cm., the branches 9 to 10 cm. long, 4 to 5 mm. thick, tapering to 3 mm. or less. The axis of this inflorescence, as shown in natural size in figure 6, was twinned or dichotomous, one division with 12 branches, the other with 13. One of the branches forked or fasciated about 4 cm. from the base, the rows of flowers more numerous and irregular in the lower part. The normal branches have 4 rows of flowers, usually very regular to near the end, tapering somewhat but ending abruptly or with the sterile tip very minute, scarcely projecting beyond

the flowers. The lower branches are 1 to 2 cm. apart, the upper much closer. The branches are completely covered with the flowers except in the axil, for one cm. or less. Some of the lower flowers are large and oblong attaining 5 mm. by 3 mm., the others regularly hexagonal, creamy white when first exposed, becoming light greenish yellow, then dull orange, the petals rather fleshy and persistent, turning purplish at the tips and withering gradually, but the opening remaining small and triangular. A rather unpleasant odor is perceptible, like the red *Trilliums*.

Peduncle with two basal joints very short, the sixth joint much the longest, enclosed by the longest spathe. Lengths of joints in centimeters: 0.7, .08, 2.8, 5.5, 7, 13, 10, 3. Lengths of spathes 3.5, 7.5, 12.5, 20, 30, 18. The basal joint is broadly amplexicaul, with a basal spread of nearly 5 cm. narrowed above to 2 cm. The first spathe has lateral carinae about one mm. wide. The second spathe is equally bilabiate with narrow carinae. The third spathe is deeply notched on one side, slightly notched on the other, slightly but distinctly carinate below the notches, at least in the dry state.

Orientation of Male Flowers in Vadia

The male flowers are tessellate, compactly arranged in four rather regular rows, completely covering and concealing the slender tetragonal branches. The branches with the flowers are about 4 mm. thick, the square flower-bearing core less than 2 mm. thick. The individual flowers are oval-oblong, 3.5 mm. long, 2.5 mm. wide, distinctly flattened, in vertical longitudinal section more than twice as broad as high, with a rather wide space between the bases of the stamens and the central pistilode. Calyx obsolete, not projecting between the flowers, but sometimes perceptible as a narrow rim bordering the

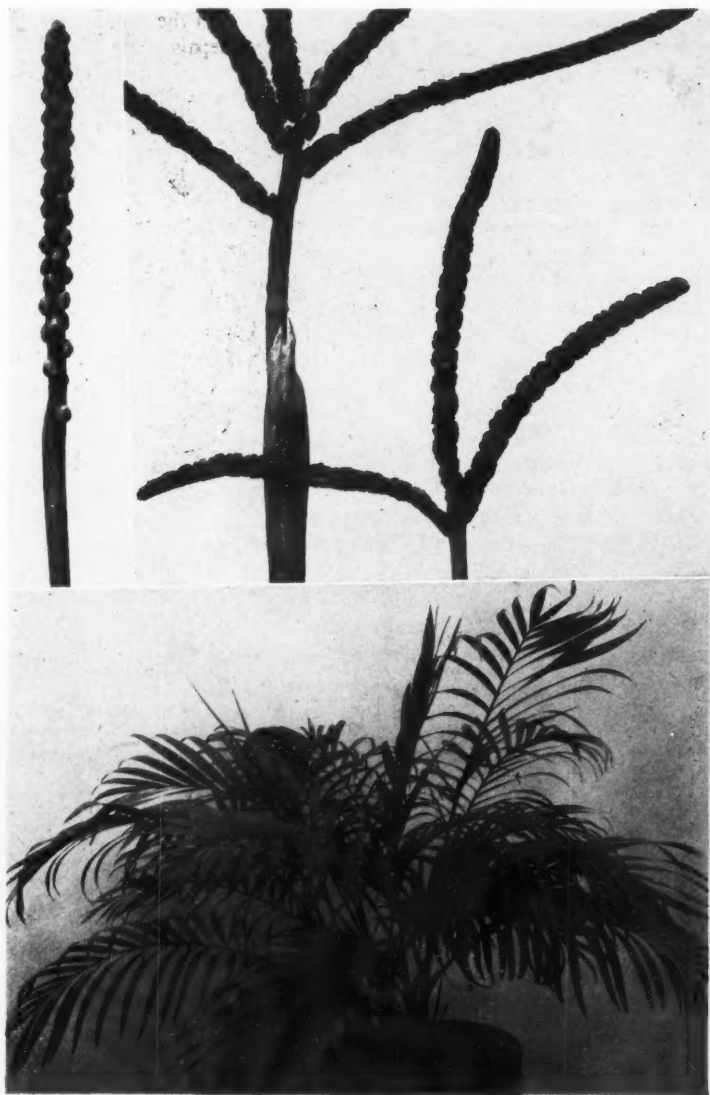


Fig. 7. *Vadia* palm, small inflorescences, natural size; greenhouse plant in 8-inch pot.

expanded base of the flower. The suppression of the calyx is a feature of the specialized orientation.

Corolla unsymmetric, in regular placement, the distal petal labriform, transverse, somewhat narrower than

the others; these in lateral positions with their margins in contact but scarcely overlapping along the median line of the flower. In view of their margins incurving rather than overlapping, the male petals of *Vadia* are to be described as valvate, not as imbricate nor convolute. Color of male flowers pale olive green, becoming yellowish and withering to light brownish, outer surface flattened at first, becoming convex and inflated at anthesis, as shown in figure 8, at the left with flowers fully opened, magnified about 3 diameters, at the middle an earlier stage with anthers becoming visible, magnified about 10 diameters. At right a sectional view obtained by splitting a flowering branch, with effective camera treatment by Mr. Robert L. Taylor.

Stamens with robust columnar filaments not tapering upward, but sometimes broader toward the end, usually incurved, the mesial surface flattened or concave; the anther cells broad, opening widely, inward and upward, becoming light brownish, pollen nearly white. Pistillodes slender and delicate, distinctly shorter and more slender than the filaments, rather deeply three-parted, the divisions pale greenish, rather sharply conic, erect and slightly divergent.

A comparable pattern of orientation is indicated in the calyx of *Omanthe*. In both sexes there are two equal oblong sepals more or less connate at the distal end of the flower, and a much narrower triangular sepal at the proximal end. The flowers of the *Omanthe* are not crowded, but the branches are slender and the flower-scars long and narrow. The calyx of the female flowers of *Stachyophorbe oreophila* is rather well developed and shows similar inequalities. The flower-scars are of oval form, less narrowed than in

Omanthe, with the distal pair of opposite oblong sepals much larger than the proximal triangular sepal.

Under the label *Chamaedorea atrovirens*, a palm agreeing with *Vadia* in habit, color, and texture of foliage was noted in the New York Botanic Garden on April 7, 1913, with a fully developed male inflorescence having 5 spathes and 6 branches. Many of the flowers are narrowly oblong, the lateral petals expanded twice as broad as the upper petal, the margins nearly straight, not mucronate. The upper ends of the lateral petals are included in the superior petal, the lower ends meeting near the median line or slightly overlapping. The generic affinity seems plain, and the name *Vadia atrovirens* (Martius) may be used. According to Burret the original specimen of *atrovirens* came from Oaxaca.

Female Flowers of Vadia

The female flowers of *Vadia*, shown in natural size in figures 6 and 7, are broadly turbinate, similar to those of *Edanthe*, somewhat less flattened and standing somewhat closer together on the branches, usually separated by not more than half the width of an individual flower. Near the base of the branches the flowers are further apart, some of them spaced two or three times the width of a flower, but near the tips of the branches almost in contact. The calyx is less prominent than in *Edanthe*, appearing as a very shallow rim, often scarcely perceptible in the fresh state. The female petals are not broadly overlapping as in *Edanthe*, but often appear separate to near the base, so that flowers of both sexes may be described as valvate. The tip of the petal often is sharply angled or mucronate but the projection minute, not thickened and recurved as in some of the related genera. A style is absent, the short stigmatic lobes robust and re-

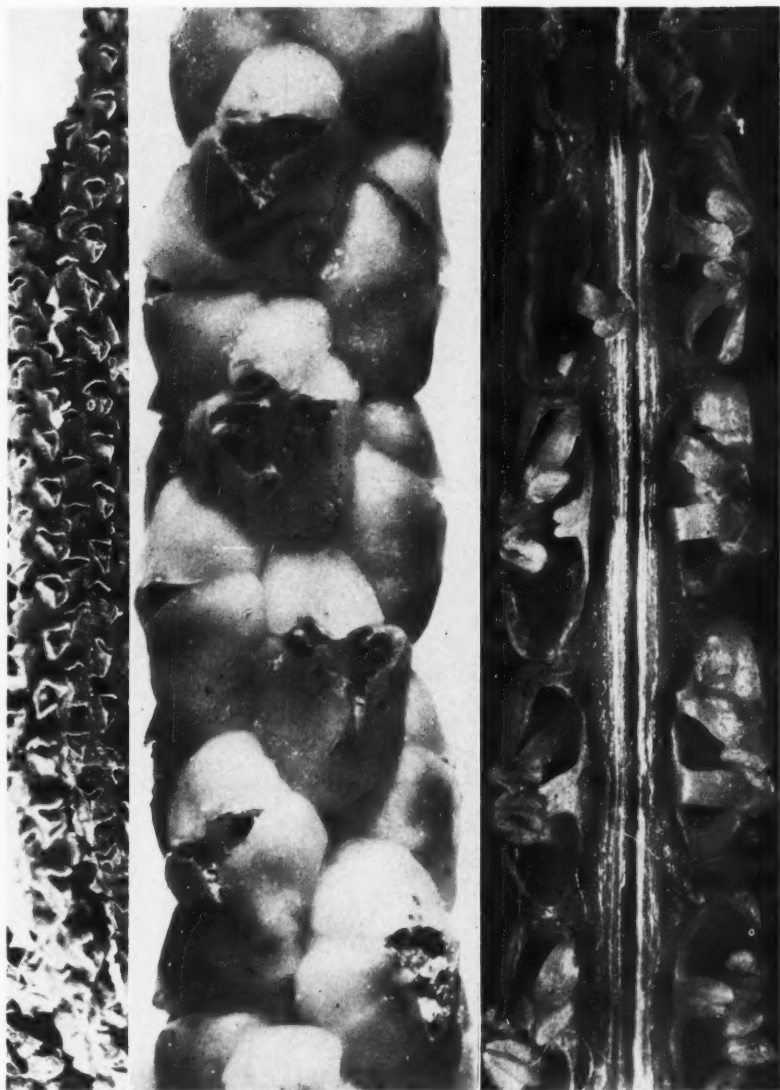


Fig. 8. Vadia palm, male flowers, magnified.

curved, separated at the base by a distinct sulcus.

In dry specimens the female flowers appear to be subtended by a rudimentary bract or transverse rim above the margin of the depression. The calyx is seen to have very short broadly rounded lobes of the same texture as the petals, somewhat coriaceous, with no indication of fibers. The petal that subtends the fertile carpel appears to be accrescent, growing twice the length of the others. Immature fruits distinctly ovate, 4 mm. long, 2 to 3 mm. wide, with persistent indurated stigmas. The petals appear rather broadly overlapping in the dry specimens, perhaps from shrinkage, since the photographs of the fresh female flowers show no such overlapping of the petals as those of *Edanthe*.

Vadia Related to Edanthe, the Edible Pacaya

As already noted, it is plain from the structure of the male inflorescence that *Vadia* is not related to *Neanthe*, but to the much larger palm named *Edanthe*, that furnishes the edible pacaya. The male inflorescence of *Edanthe* is the edible part, with rather thick fleshy branches, and the surface of these completely covered with the male flowers, flattened and set close together, like tiles in a pavement. This type of floral arrangement is known as "tessellate," and is shown in the illustrations of *Edanthe*. Although the inflorescences of *Vadia* are much smaller, with fewer, shorter, and more slender branches, the essential similarity will be apparent when the illustrations, notably those of figure 4 and figure 7, are compared with those of *Edanthe* in the NHM for July 1939.

Another feature of *Vadia* tending to support the alliance with *Edanthe* is the ample spathes of the male inflorescence, notably expanded to protect the in-

floresce to near the time of flowering, as shown in figure 1. Also the foliage is rather fleshy and of a vivid green color as in *Edanthe*, but in other respects there are complete contrasts, as the very narrow pinnae with only a single submarginal vein well developed. The leaf sheaths of *Vadia* are very short and deeply split, instead of the long, cylindrical, closed sheaths of *Edanthe*. The absence of a trunk is the most striking difference, the long-jointed trunks of *Edanthe* growing 20 feet tall, with a diameter of 3 to 4 inches. The succulent texture of the petioles and leaf-sheaths in *Vadia* is another similarity with *Edanthe*, but *Vadia* shows no tendency to marcescence, that is the injured tissues do not blacken as in *Edanthe*.

Vadia Compared with Stachyophorbe

A palm with notable similarity to *Vadia* was collected around waterfalls in the State of Oaxaca in 1842, by Liebmann, a Danish botanist, and reported in 1845 under the name *Stachyophorbe cataractarum*. The habitat may not be the same as in *Vadia*, since the palms are reported on blocks of rock fallen from the cliffs of a mountain gorge and may not have grown in the streambed. The leaf form is very similar to *Vadia* with the pinnae rather narrow and close but more numerous, 22 on a side. Three of the veins are prominent, but five or six others are rather distinct and the white vitta is strongly developed. The pinnae attain a width of 13 mm. in one of the specimens from the Copenhagen Museum but only 9 mm. in the other, a contrast like that shown by the two leaves of *Vadia* in figure 3. The upper pinnae are close together and in one instance two of the narrow pinnae remained attached, but the others are separate, with a width of only 3 to 5 mm.

The divergence of *Vadia* from *cata-*

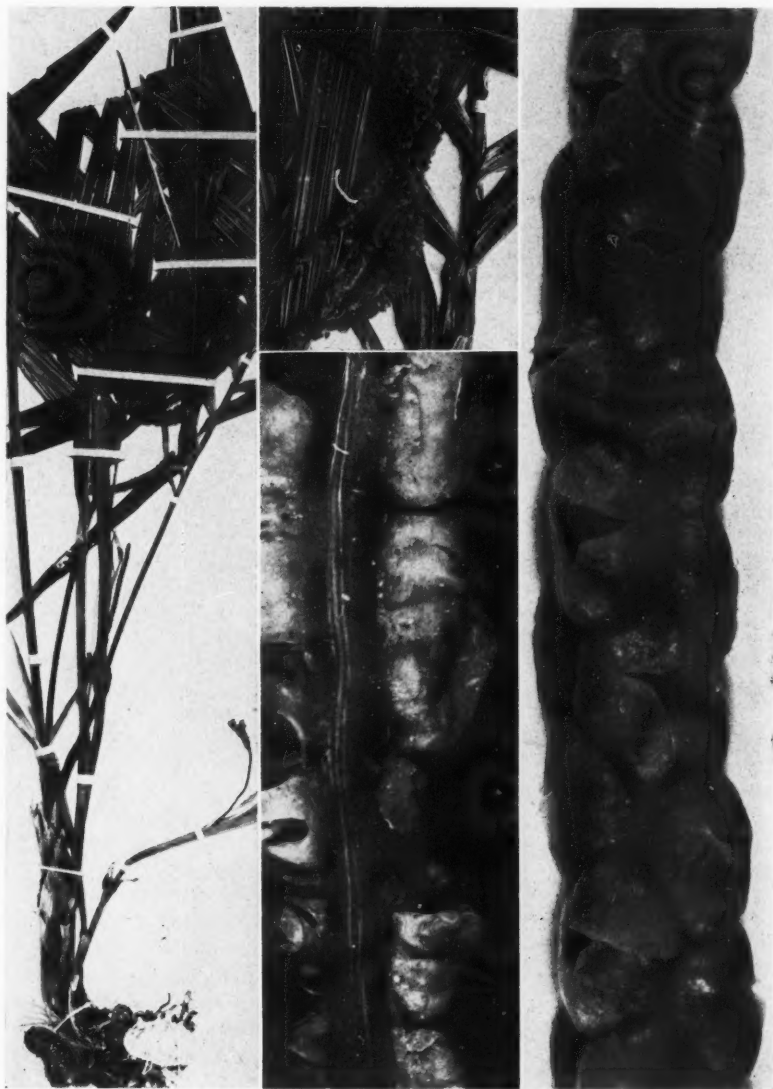


Fig. 9. *Encheila* palm, reduced, natural and magnified.

ractarum is not the critical question since the genus *Stachyophorbe* was based on a different species, *Stachyophorbe oreophila* (Martius), with an erect, short-jointed trunk, broader and

more plicate pinnae, the terminal pinnae fused, the male inflorescences simple, and remarkably attenuate. Such inflorescences are illustrated in NHM for October 1943, p. 151, and have lit-

the resemblance to the short, fleshy, ramified male inflorescences of *Vadia*, which have the terminal spathes enlarged and the branches not exposed until the flowers are nearly mature. The spathes of *Stachyophorbe* are extremely narrow and closely fitted to the very slender peduncle. A male inflorescence obtained from a palm in the Gillespie collection at Santa Barbara, Calif., October 6, 1931, is 86 cm. long, the peduncle 68 cm., the spike 18 cm. The peduncle was 3 mm. thick near the base, 2 mm. above the base; the spike 8 mm. thick. The spadix of *oreophila* was reported to Martius by Liebmann as 3 feet long, exceeding the leaves, the spike as six inches long, the fruits as yellow, the size of coffee berries. The spadix of *cataractarum* was 7 to 15 inches, shorter than the leaves, the spikes 3 in., the fruit the size of peas. The seeds of the type specimen are broadly obovate, 6 mm. long by nearly 5 mm., covered with close parallel fibers, anastomosing only above the raphe. The description of *cataractarum* may relate only to the female sex, while both sexes of *oreophila* appear to have been obtained.

The foliage offers the most striking contrasts between the type specimens of *oreophila* and *cataractarum*. The structure of the rachis is markedly different, with the vitta of *oreophila* relatively narrow, but much more prominent, forming a thin median ridge 4 to 5 mm. high at the base of the leaf-blade. No such ridge is developed from the vitta of *cataractarum*. The leaf blade as a whole shows a marked difference in pattern and proportion, larger in *oreophila* but relatively short and broad, about 70 cm. long and 50 cm. wide, while the leaf blade of *cataractarum* is about 50 cm. long and 25 cm. wide, with 22 or 23 pinnae on a side, and these relatively narrow and short, like the pinnae of *Vadia*.

The pinnae of *oreophila* are much fewer and much broader, only 12 or 13 on a side, with the terminal pinnae double or triple, 4 to 6 cm. wide. A fifth pinnae is 33 cm. long, 4 cm. wide. Some of the lower pinnae have separated from the rachis, and one of these is 52 cm. long and 3 cm. wide, with an apical section of about 7 cm. plane and firmly indurated, in contrast with the longitudinally grooved and wrinkled surface elsewhere. Other pinnae show a smaller development of this apical spur and a somewhat similar tendency is perceptible in the pinnae of *Vadia* shown in figure 3, with the midrib running close to the margin about 1 cm. below the apex. The midvein in the basal section of a pinna of *oreophila* is distinctly closer to the upper margin, but in the distal section is closer to the lower margin. Sockets of pinnae rather long, 1.5 cm. apparently separated in drying; no such tendency in *cataractarum* or in *Vadia*.

Vadia Distinguished from Cladandra

Confusion may arise from the male inflorescence of *Vadia* having a general resemblance to that of *Cladandra*, another trunkless palm made known by Oersted's beautiful illustration published under the name *Stachyophorbe pygmaea* in *L'Amerique Centrale*, Table 4, but widely different from either of the two species that Liebmann originally placed under *Stachyophorbe*. The name *Cladandra* was proposed in NHM for October 1943, p. 148. The female inflorescence of *Cladandra* is simple, as often occurs in *Vadia*, and further parallels are presented by the short-jointed creeping rootstock, open leaf-sheaths, and spreading lanceolate pinnae with three prominent veins. Yet the structure of the flowers and other contrasting features leaves little doubt that the several resemblances are only



Fig. 10. *Mauranthe* palms, both sexes.

superficial, though not without interest as examples of parallel evolution.

The leaf-sheaths of *Cladandra* are described by Wendland as 4 inches long and the petioles as only $1\frac{1}{2}$

inches. Oersted's natural-size drawing shows the rachis about 5 inches long, the pinnae 5 to 6 inches, with only one prominent vein on each side, not in the usual submarginal position as in *Vadia*

but nearly as remote from the margin as from the midrib. The terminal pinnae are not reduced, but somewhat wider than the others, nearly an inch in the middle, while two or three pinnae at the base of the leaf-blade are less than half an inch wide. The drawing shows the petiole as deeply grooved to near the upper end, thus confirming the indication of the petiole being specially reduced.

The male flowers of *Vadia* are not at all of the pattern of *Cladandra*, either in structure or arrangement. The flowers of *Cladandra* stand rather far apart with narrow erect petals, instead of the floral chambers being flattened and the flowers set close together to cover the branches as a continuous pavement. Also the filaments and the pistillodes of *Cladandra* are slender and erect, supported with the petals on a staminal cushion, the structure that in *Neanthe* is notably enlarged to fill the lower half of the globular floral cavity and support the relatively short, robust, apically expanded pistillode characteristic of *Neanthe*. In comparison with *Vadia* the floral structure of *Cladandra* appears very primitive, with a basic resemblance to *Neanthe* but notably less specialized.

The narrow, short spathes of *Cladandra*, not extending beyond the lower branches of the inflorescence, may be taken to indicate an early emergence of the floral buds as in *Neanthe*, rather than a late emergence which in *Vadia* is made possible by the rapid elongation of the terminal portion of the peduncle. The lack of chlorophyll in the peduncle and axis may be connected with the power of rapid extension of the male inflorescence in *Vadia*. Wendland states that the sepals and petals of both sexes are green in *Cladandra*, as is the case of *Neanthe*, until the stage of maturity is reached, and the flowers turn yellow. The habitat of

Cladandra is uncertain, whether Chiapas or Colombia.

A Palm Like Vadia in Oaxaca

The special interest and activity of Mrs. Ynes Mexia in collecting palms was recognized in relation to "A New Commercial Oil Palm in Ecuador," found by Mrs. Mexia in 1934 and described under the name *Ynesa colenda* in the NHM for April 1942. The last collection by Mrs. Mexia was made in southern Mexico in 1938, and included two new genera of the Chamaedorea group, one of them described under the name *Lophothele* in the NHM for October 1943, pp. 142 and 149. The specimens of *Lophothele* were collected in the Montaña de Santa Maria in the Choapam district, in the "understory" of virgin forest, at an altitude of about 1,500 meters. Mrs. Mexia noted a short trunk, 1.52 m. to the first leaf, length of leaf 45 cm., pinnae 11 pairs. Both sexes were obtained, the male specimen No. 9278, the female 9279.

The other genus is represented by a male specimen of a small palm very similar to *Vadia* in structure and probably in habits as well, although this individual is said to have grown under "shade in a coffee plantation." The locality given by Mrs. Mexia is Yaveo in the district of Choapam "near the Arroyo de las Culebras" at an altitude of about 450 meters, No. 9132, March 12, 1938. Yaveo is only a few miles south of an area rather famous among botanists under an early name Chiantla, which furnished many plants not found in collections from other parts of Mexico. Confusion has arisen with Chinaulta and several similar names in other districts. A special paper on "The Meaning and Usage of the Mexican place name Chiantla" by Richard Evans Schultes has appeared in Botanical Museum Leaflets, Harvard University, Vol. 9, No. 6, March 14, 1941.

The discovery of palms in the Chiantla area dates from the Danish botanist Liebmann who spent 14 days in that district in 1942, and found ten new palms, as many as he reported from other parts of Mexico after 2½ years. The palms that are specialized to live as undergrowth no doubt are restricted to localities where the original forests survive, or at least were never completely cleared. Denuded districts may be reforested, but the undergrowth flora of palms and other shade plants remains deficient for long periods, marking one of the distinctions between original forests and second growth.

Male Flowers of Encheila and Vadia

The name *Encheila* is proposed for the palm collected by Mrs. Mexia in Oaxaca, in allusion to the form of the male flowers, with the upper petal transverse as in *Vadia* but its lateral margins in most cases definitely included or overlapped by the margins of the other petals. In other words, the petals of the male flower of *Encheila* are to be described as imbricate, instead of valvate as in *Vadia*. As the photographs show, the flowers of *Encheila* in Figure 9 are not so closely compressed and fitted together as those of *Vadia* in Figure 8.

The upper petal in *Vadia* may appear to overlap slightly or to be overlapped by a lower petal, while in *Encheila* the upper petal usually is definitely overlapped on both sides, also relatively smaller than the others, and only slightly mucronate. A sectional view of the flowers of *Encheila* was not obtained, but the lateral view of a flower magnified nearly 15 diameters is shown near the middle of figure 9. The stamens of *Encheila* are similar to those of *Vadia*, but the filaments shorter and the anther cells notably smaller and apparently of firmer texture, forming in the dry state nearly

circular cupules, not extruded at anthesis, nor emerging at the aperture.

The flowers of these genera may be compared with a less specialized stage of orientation in *Edanthe*, illustrated in the NHM for July 1939, p. 173. The male petals of *Edanthe* are nearly equal, with the flowers quadrate or trapezoidal, as broad as long, the upper and lower sides nearly straight, the lateral curved or angled, fitting between the flowers of the next row. A definite orientation is to be recognized in *Edanthe*, since the upper petal is transverse and the other oblique, meeting at the lower angle, but the pattern is relatively simple. The flowers of *Vadia* resemble those of *Edanthe* in being more completely tessellate than those of *Encheila*, that is, more definitely fitted together and more flattened on the surface, but *Vadia* and *Encheila* are alike in the general outline of the flowers being longer than broad, oval in *Encheila*, elliptic or fusiform in *Vadia*.

Plant Characters of Encheila

To judge from the single specimen, the plant may be shorter and more compact than *Vadia*, and also the male inflorescence may be shorter and with fewer branches. The reduced photograph of the type specimen at the left of figure 9 is less than half natural size, but a small section of this is shown without reduction, so that parts of the rachis, pinnae and inflorescence branches can be seen in true proportions. At the right is an enlargement of a flowering branch to about ten diameters, and in the lower middle a flower and a single stamen, enlarged nearly 15 diameters.

The root-stock of *Encheila* is very short-jointed, firm and woody, of more compact texture than in *Vadia*, with embedded root bundles more indurated. The leaves have short, deeply-split sheaths about 9 cm. long, with the sur-

faces somewhat more finely and closely striate than in *Vadia*. Petiole 10 cm. long, the rachis about 25 cm., slender, the vitta well developed. Pinnae about 15 on a side, in form and attachment much as in *Vadia*, and with three prominent veins underneath, the outer veins somewhat stronger than in *Vadia* and more remote from the margins. Also the three prominent veins appear to be more flattened than in *Vadia*, and often are minutely denticulate along the edge of the flange. The lower vein often appears thicker than the midvein, near the base of the pinnae, while the midvein is thicker in *Vadia*. Referring to the small natural-size photograph in the upper middle of figure 9, the section of a pinna shows the prominent veins less distinct than in some of the pinnae of the reduced photograph at the left, but the grooving of the surface between the veins in the natural-size photograph is normal. As in *Vadia*, the terminal pinnae of the leaves of *Encheila* are not notably reduced, one of them being slightly wider than the subterminal pinnae.

The spathe of *Encheila* appear to be somewhat more compact and possibly of thinner and firmer texture than in *Vadia*. The basal spathe is relatively longer, about 2.5 cm., the second spathe 4.5 cm., with the first and second joints of the peduncle extremely short, 2 mm. or less. Third spathe 4.5 cm. long; the fourth 10 cm., shown with the inflorescence emerging well below the apex, in the reduced photograph.

Summary and Index

Cladandra, compared with *Vadia*, page 30.

Edanthe as related to *Vadia* by tessellate flowers, succulent foliage and prominent venation, page 28.

Encheila, new genus, *E. transversa* type species, from Yaveo, Choapam district of Oaxaca, distinguished by the extant calyx, imbricate corolla, and transverse labriform superior petal included between the others, the minute concealed stamens and hemispheric anther-cells, figure 9, page 32.

Lobia as specialized foliage pattern contrasting with *Vadia*. Pinnae more remote, more divergent, more unequal, more abruptly attenuate, the distal margins erose, the basal angles auriculate, the rachis and adjacent veins and margins minutely hispid-rugose or cunculate, figure 4, page 20.

Lophothele from Choapam district Oaxaca, page 32.

Mauranthe lunata, from eastern Guatemala, example of normal trunk formation, figure 10, page 14.

Omanthe, orientation of calyx-lobes, page 26.

Stachyophorbe, compared with *Vadia*, page 28.

Vadia new genus, *V. jotolana*, type species from Chiapas, between Ocosingo and El Salto. Trunk reduced to a horizontal repent rhizome, pinnae linear, 3-veined. Staminate inflorescences moderately ramose, the flowers oval-oblong tessellate, with regular orientation in four rows, the superior petal transverse, the lateral petals approximate in the median line, filaments robust, anthers oval oblong, pistillodes remote from stamens, erect, tripartite. Figures 1-3, 5-8, page 14. *Vadia atrovirens* (Martius) page 26.

Rooting Rex Begonia Cuttings by Hydroponics*

GEORGE B. FURNISS

When it came to rooting the leaves or foliage-cuttings of the Rex Begonias, the writer was a failure without any ameliorating adjectives. What seemed so simple for others, that is to root such cuttings in sand or in some rooting compost, I just could not get the knack persistently as I tried. Thus I became forced to accept defeat notwithstanding a long experience in garden, hothouse and lathhouse practice.

There is a midpoint between being too dry and too wet which is difficult to keep—or so proved with me—and yet such is a very necessary moisture-balance in sand to prevent damping off. Finally and definitely frustrated, I went completely wet—to 100% water.

When excess of water was my trouble and then going all out with the offender seems like jumping from the frying pan. It is understandable that this damping off is due to an excess of water which keeps the air crowded out from between the soil particles. Likewise this air is just as necessary in water as in soil for root development.

The procedure then is to submerge the base of the cutting somewhat below the surface as that area is the best aerated—air decreases with depth. Rooting in water may not be orthodox, or professional, but like the rose with another name, the word "hydroponics" came to the rescue by giving a scientific vestage. Water alone is sufficient and does not make weak plants as commonly believed unless the cuttings are left immersed too long—the same as cuttings become flabby if left in sand until the roots are over developed.

However, a nutrient added to the water hastens root formation and vigor of growth. Such a solution may be made by dissolving a level teaspoonful of a garden fertilizer, known as a balanced mixture, in a quart bottle of ordinary water. Shake well and use this as the rooting medium. Should potassium permanganate be available, add about $\frac{1}{2}$ of a quarter-size measuring spoon to the solution. This suppresses the formation of green algae which is not harmful but for appearance sake only.

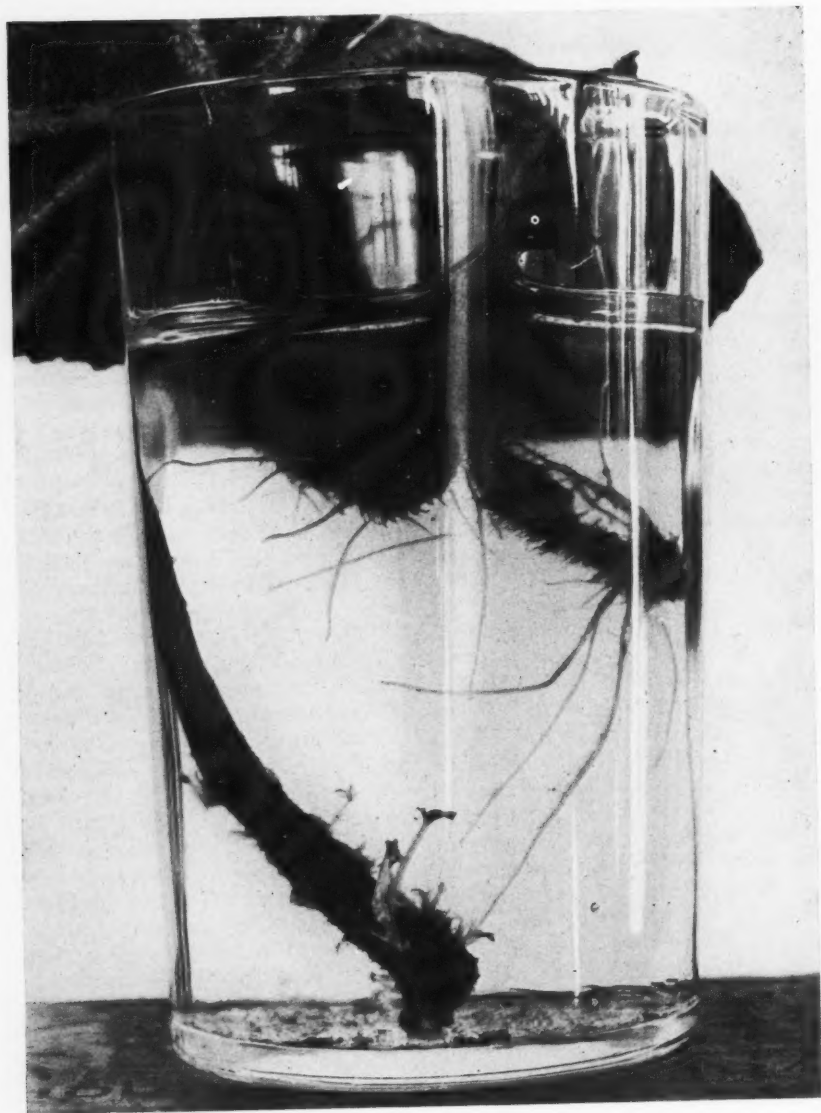
Those who are having difficulty in rooting soft-wood cuttings will find this method helpful, such as with fuchsias, geraniums, chrysanthemums, African violets (*sauntpaulia*).

Figure 1—Rex Begonia leaf and cuttings are rooting in chemically prepared water. The glass container is kept filled to within a half-inch of the top. Mature leaves are used as those ready to be discarded because of browning edges and losing vigor. June through September is a favorable period for rooting or any season under warmth.

A desirable situation is a sunny window with strong line but shielded from direct sun. The leaf rests upon or hooks over the brim of the glass. Leaf cuttings are supported by hair-pin wire placed across the glass and strung so as to allow about an inch of the leaf-base to hang below the surface of the nutrient solution.

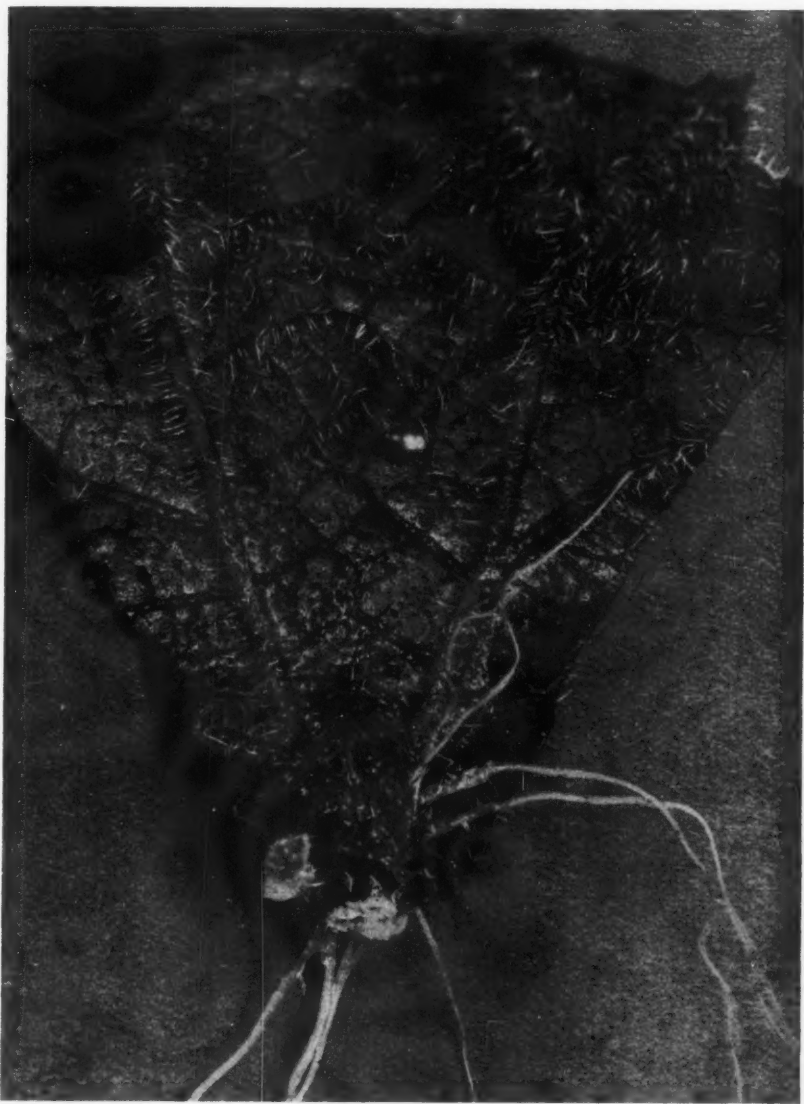
Figure 2—This leaf cutting, wedge shaped, is developing roots; it is two months old and now ready for potting in a $2\frac{1}{2}$ -inch pot. By making a circular cut in the original leaf on the reverse side just below where the large veins fork, there will be enough leaf

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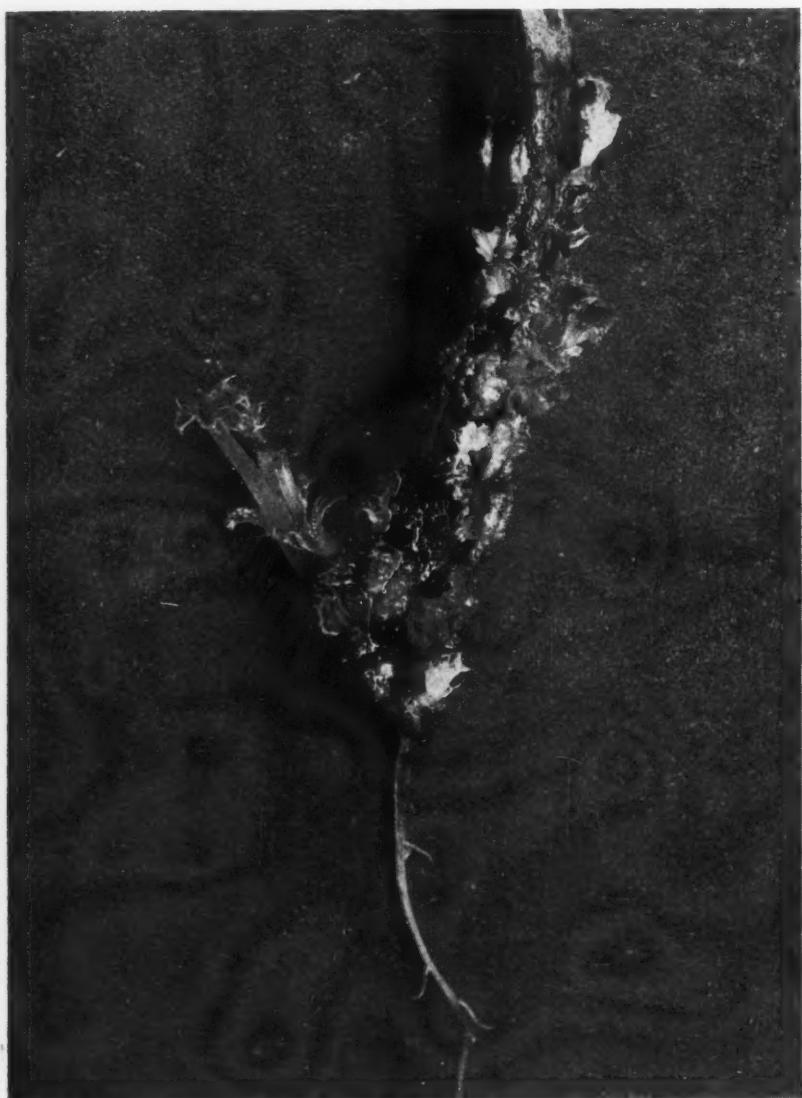
George B. Furniss

Fig. 1. Rex Begonia leaves rooting in water.



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Fig. 2. Wedge-shaped Rex Begonia leaf cutting rooting in water. Two embryo plants, more coming. Two months old and ready for potting.



George B. Furniss

Fig. 3. Rex Begonia leaf stem. Husky plant at base with clusters of embryonic plants along the stem. Two months old and ready for potting.



George B. Furniss

Fig. 4. Rex Begonia leaf cutting rooted in water and transferred to soil at two months of age. Now four months old with several shoots and more coming. When finally separated this will make ten plants.

tissue left to make several wedges like this one. Also there is enough tissue left to make a "toad-stool" top to the stem. A strong plant usually develops from the center eye in this top. The stem is cut off square about 2 inches below the leaf.

It is interesting to watch the progress of rooting, the many variations and formaions—and the differences, perhaps due to particular varieties.

Figure 3—A husky little plant is starting from the base of the stem and the clusters along the stem are embryo plants. Now two months old and ready for potting. The embryo plants will develop roots and later may be separated when repotting. These embryo plants are induced, with exceptions due to variety, by two methods. First by a straight shallow-cut with a sharp knife downward along the stem at the base, cutting about one-sixteenth inch deep. Secondly by making cross cuts about one-quarter of the stem's diameter deep and one-half inch apart. Only one root has developed but more will come later.

Figure 4—Plants are developing in a 2½-inch pot—seven shoots and three coming; now four months old. In about two months more, these shoots may be separated with a sharp knife and each shoot planted alone, with its roots attached, in a 2½-inch pot, making 10 new plants.

Compost suggestions: 2 parts well decomposed leafmold such as may be found under trees after raking off the top dry leaves (or decayed "rotted" old wood, or peatmoss, if leafmold is not obtainable), screen through ¼ inch mesh; 2 parts coarse sand; ½ part

garden loam, sifted. Good drainage is essential such as by gravel or charcoal (embers raked from the garden fire)—about half inch in the bottom of the pot.

The compost should be slightly moist for potting purposes. A safe way is to water indirectly. Insert the pots in a flat of garden soil, leaving the brim about half-inch above the soil surface. Keep this surrounding soil damp, not wet. The pots will absorb sufficient moisture for root development until a root system is established. Larger sized pots with soil instead of a flat is more convenient for a few plants.

The Rex Begonia, well grown, is majestic and outstanding in appeal among potted ornamentals. The eye is quick to spot it among a mixed collection of plants and it accents such a group as does maidenhair fern in a floral arrangement. Rex seed does not come true from its parents so that the only way to perpetuate a particular variety is by division of the rhizome which may be unsafe, or by leaf cutting. A collection of Rexes alone is a fascinating enjoyment . . . so many variations. As to this: Lillian Ashe led a group of San Francisco members of the American Begonia Society to its annual Convention and Flower Show held at San Diego. She writes: "Ah! The Rexes! We have never seen such a lavish variety of different specimens, many of them being entirely new to us. Nature certainly outdid herself in richness of color, multiformity and diversity of pattern. No artist can imitate her."

Oakland, California

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Primulas for shaded areas

The article by Louise Ihlder in the July issue of this Journal has arrested my attention because I find no reference to the genus *Primula* in her list of shade-tolerant plants. My experience in growing primulas, during the last twenty years, in the San Francisco Bay area, has shown that most of them are not merely tolerant of shade but demand it and I have been compelled to supply it by constructing small lath houses since my city lot does not afford natural shade. This is in accord with the experience of others in this vicinity. Here our sunshines during the spring and summer months is tempered for several hours of the day by light high-floating clouds and both our daily average and daily maximum temperatures are much below those of New York, Chicago, and Washington.

Additional characteristics which make the species of *Primula* desirable border plants are the wide diversity in their habits of growth and time of flowering, the beauty and profusion of their flowers, and with certain exceptions, their ease of culture. As to their hardiness I would cite the fact that a 1938 seed catalogue of an English firm lists seventy-four species of which sixty-nine are rated as hardy perennials. The contents of British horticultural magazines for the past twenty years show that nearly all of these sixty-nine species are grown with success out-of-doors in Great Britain. It is unfortunate that in the United States the name *Primula* has become associated with two of the very few greenhouse species only, namely, *Primula obconica* and *Primula malacoides*. The one hardy species, which is widely grown as a

border plant, that is the *Polyanthus*, is not generally recognized as a *Primula*, although it is derived from a natural hybrid between the English primrose (*Primula acaulis*) and the cowslip (*Primula officinalis*). It might also be noted that the above mentioned sixty-nine species should be expected to be hardy since their native habitats are located either in sea level regions whose climate is temperate or in mountainous regions whose elevations are sufficiently high to insure long and severe winters.

Successes in growing a number of these species, at widely separated localities in the United States and Canada, are on record. The thirty pages devoted to them in Mrs. Wilder's *Adventures in my Garden and Rock Garden* give some information on this matter. I have reviewed the files of *Horticulture* (Boston), *The Garden Magazine* (New York), *Gardeners' Chronicle of America* (New York), *Quarterly of the American Primrose Society* (Portland, Oregon), and this *Journal* for the past twenty years and find brief accounts of the experiences of amateur growers with many of these species. There are reports of successes from nearly all the New England and Middle Atlantic States as well as Michigan, Minnesota, Illinois, Ohio, Virginia, West Virginia, and especially Oregon and Washington. A remarkable interest in primulas has arisen during the last five years in these two last named states. This interest is closely linked with the formation of the American Primrose Society in Portland, which now has a membership in excess of seven hundred, stages an annual *Primula Show*, and publishes a

quarterly magazine. A further consequence has been the establishment of a number of small nurseries which supply plants and seed of many of the species.

Here in California the conditions are somewhat less favorable than in Oregon and Washington. Certain species miss the long cold winters of their natural habitats and, owing to a rather high winter temperature and heavy precipitation, are subject to decay of their root system unless especial attention is given to drainage. We are also obliged to exercise constant vigilance to maintain the abundant water supply which they need during the growing season.

It is not the purpose of this article to describe the beauties or outline the peculiar cultural needs of the different

species. Much information on these subjects is to be found in Bailey's Encyclopedia of Horticulture. It will, however, list certain species which I have grown in California and found pleasing, which are generally rated as easy to grow and of which plants or seeds can be obtained either in the United States or England. The list includes: the auricula, especially the alpine strain, *P. alpicola* var. *violacea*, *P. Beesiana*, *P. Bulleana*, *P. burmanica*, the Bullesiana Hybrids, *P. cortusoides*, *P. denticulata*, *P. Forrestii*, *P. frondosa*, *P. Florindae*, *P. japonica*, the Juliana Hybrids, *P. lichiangensis*, *P. Mooreana*, *P. officinalis*, *P. pulverulenta*, *P. rosea*, *P. sikkimensis*, *P. Sieboldi*, *P. Veitchii*, and *P. vargongensis*, usually known under the name of *P. Wardii*.
WALTER C. BLASDALE.

Rhododendron Notes

CLEMENT GRAY BOWERS, Editor

Double Azaleas

Nursery catalogs and popular horticultural works, when describing azalea flowers, are full of indiscriminate and confusing use of such terms as "hose-in-hose," "double," "semi-double," and "fully double."

Little difficulty arises in using "single" to describe the most common azalea flower form with its calyx of five green sepals (or more accurately five calyx lobes since they are usually fused at the base into a tube), its corolla of five colored petals or corolla lobes, and finally its five to ten stamens and single pistil. Sometimes the sepals are quite minute and inconspicuous. But with the increase of petals through the transformation of sepals or stamens or both various doubling effects occur that correspondingly vary the flower's

appearance. These effects give rise to decidedly different esthetic values in the gardener's eye. They also serve as a method of identifying some of the named hybrids. According to S. F. Blake, senior botanist, Division of Plant Exploration and Introduction, U. S. D. A., his profession would designate any such transformation of sepals or stamens to petals as petalody of the calyx or stamens, and any increase of petals without or in addition to transformation to petals of other flower parts as a form of chorisis. Botanists can hardly expect the laymen to take these hurdles gracefully.

These "doubling" effects in azaleas usually take one of four general forms:

First, the sepals, but not the stamens, are fully transformed to petals. If the transformed sepals look the same as the

petals and the calyx and corolla have the appearance of two cycles of petals, one growing within the other, thereby giving a double-decker effect, then the flower is hose-in-hose. This type of flower is common among azaleas. Examples are Kurumes Coral Bells and Ho Oden, Pericat hybrids Hampton Rose and Morning Glow, Gable hybrids Chinook and Mary Dalton, and Rutherfordiana hybrids Dorothy Gish and Salmon Glow. The sepals of a hose-in-hose flower are "petaloid" sepals. Thus the flower will have five petals and five petaloid sepals or for the less discriminate but still accurate, ten "tepals." The lay gardener will content himself with saying the flower has ten petals. In general the nurseryman uses the designation, hose-in-hose, for flowers in this group, but occasionally he designates them as double.

Sometimes the sepals are only partially metamorphosed into petals. In Pericat hybrid Hampton Beauty and Glenn Dale hybrid PI 141788, and Kurume Christmas Cheer, the transformed sepals are smaller and narrower than the petals or are contorted. Such flowers are not hose-in-hose. In Kurume Debutante only some of the sepals may change to small, contorted petals. Some nurserymen also call these flowers hose-in-hose. Their appearance is more nearly that of a single flower.

Second, in another form of doubling, the stamens, but not the sepals, are fully changed to petals. This results in filling in at least, in part, the space occupied by stamens in single flowers. The pistil is usually but not always retained. Among azaleas such flowers are much rarer than the hose-in-hose type and the center petals created by the transformed stamens are usually smaller than the regular petals. Azalea examples are Kurume Shishu and Gable hybrids La Premiere and Louise Gable.

For azalea flowers with fully transformed stamens, but true sepals, there seems to be no distinctive name. B. Y. Morrison, editor of THE NATIONAL HORTICULTURAL MAGAZINE, and Clement G. Bowers, author of Rhododendrons and Azaleas, would not use the term "petaloid stamens" but would restrict that term to partially transformed stamens where the character of the stamen is still apparent. Morrison suggests "semi-double" for this type of flower, but Alfred Rehder, one of the authors of Rhododendron Species and of A Monograph of Azaleas, and W. H. Camp,¹ assistant curator, New York Botanical Garden, restrict "semi-double" either to flowers where only some of the stamens are transformed to petals or to flowers where the transformed stamens are not changed to full fledged petals, respectively. To the nurseryman these flowers are double. However, the amorphous term "double" tells little, for it may mean merely an increase in the number of petals without change in the stamens, or a transformation of sepals to petals as in a hose-in-hose flowers, or a replacement of disc florets with strap or ray florets as in the Compositae.

Further, there are flowers with unchanged sepals but changed stamens in which the stamens, or some of them, are only partially and not fully transformed to petals. Such petals are either small and narrow or contorted or else the filament or anther of the stamen or both remain visible. Gable hybrid 38-G, and occasional flowers on *austrina*, exhibit this trait.

Third. When you consider azalea flowers that have both the sepals fully transformed to petals and the stamens partially transformed to petals, the sit-

¹Camp points out that transformed or petaloid stamens are called by the botanist staminodia, i.e., abortive or sterile stamens, but staminody usually refers to the reverse change from other parts of a flower into stamens.

uation is worse. Some nurserymen call these flowers "fully double." Their partially open buds frequently resemble a rose or camellia bud. Pericat hybrids Harmony, Glory, Splendor, Richesse, and Rival and *indicum* Sweet (macrantha) Warai-gishi, are examples of hose-in-hose with stamens partially transformed to petals.

Fourth. A final class apparently involves an increase of petals irrespective of, or in addition to, a transformation of sepals or stamens to petals. The center of the corolla is quite filled in. In azalea *mucronata* f. *plena* (Fujimanyo) the sepals are retained but all the stamens are transformed or partially transformed to petals. Frequently what appear to be small green rudimentary leaves show in the center of the flower and some of the partially petaloid stamens show green or fringed tips. However, the 30 or so petals are a larger number than can be accounted for by transformation of the ten stamens of the species *mucronatum* to

which Fujimanyo is assigned. *Poukanense Yodogawa* and the Indian azalea, William Bull, present a similar situation. A breaking up of the tissues of the pistil may account for the extra petals not attributable to transformed stamens. Similarly two tiny petal-like appendages are occasionally found at the base of the filament of the stamen in the flowers of some azaleas. I have observed no azalea where in addition to the abnormal increase in petals the sepals have been transformed to petals so as to give, for instance, a hose-in-hose effect with an entirely filled in corolla.

Other unusual flowers are Rutherfordiana hybrids Crimson Glory, which has five sepals and five petals but about 15 to 20 stamens either partially petaloid or unchanged, and Alaska, which has five sepals and five stamens but ten petals. Ordinary observation would not determine whether these five extra petals in Alaska are transformed stamens in a ten-stamen flower or are duplicate

| | Blake | Bowers | Camp | Morrison | Rehder |
|---|-----------------------------|---------------------------|--|--|---------------------------------|
| 1. (a) Fully transformed sepals | Petaloid sepals | Hose-in-hose ² | Hose-in-hose or petaloid sepals | Hose-in-hose ² or petaloid sepals | Hose-in-hose or petaloid sepals |
| (b) Partially transformed sepals | ----- | ----- | ----- | ----- | ----- |
| 2. (a) Fully transformed stamens | Petaloid stamens | Semi-double | Petaloid stamens or staminodia | Semi-double | Double if number increased |
| (b) Partially transformed stamens | ----- | Petaloid stamens | ----- | Petaloid stamens | ----- |
| (c) Only some stamens transformed | ----- | ----- | ----- | ----- | ----- |
| 3. Both sepals and stamens transformed | Petaloid sepals and stamens | Double | Hose-in-hose with petaloid stamens or staminodia | Double | Double with petaloid sepals |
| 4. Increase of petals without transformation of sepals or stamens | Pleiotaxy of petals | Double | Duplicate petals | Double | Double |

²Only if sepals fully transformed to petals and fused so that calyx and corolla have same appearance and look like two cycles of petals one growing inside the other.

petals in a five-stamen flower. About the best the nurseryman has been able to devise for flowers with a large increase in number of petals is "double," "very double," or "quite double."

Views as to appropriate designations for various types of doubling in azaleas were obtained from five experts whose names have been above mentioned. The views expressed are roughly summarized in the chart on opposite page.

Under the circumstances no one can blame the nurseryman or popular horticultural writer for making indiscriminate use of such terms as double, semi-double, and fully double, or even occasionally misusing hose-in-hose. A classification of azalea flower types along with lines provided for peonies by the American Peony Society might be useful. Groupings that take account of obvious differences in appearance, rather than groupings botanically exact, would be most helpful. A tentative suggestion is—

Class I. Single types: Flowers with true (or only partially transformed) sepals, true petals, and normal stamens. The conspicuous stamens and pistil give this type its distinctive appearance. Examples: Kurumes, Hino-degiri, Debutante, and Christmas Cheer, the species Kaempferi, Pericat hybrid Hampton Beauty, and Glenn Dale hybrid PI 141788.

Class II. Semi-double types: Flowers with true (or only partially transformed) sepals, true petals, but all or most of the stamens partially transformed to petals, i.e., the transformed stamens are smaller than the true petals or contorted or the anther or filament of the stamen remain evident. In addition there may be extra petals of similar appearance not accounted for by transformation of stamens. There may be a few normal stamens or a few stamens fully transformed to

petals. Examples: Gable hybrid 38-G, Indian William Bull, *mucronatum* f. *plena* (Fujimanyo), and Rutherfordiana hybrid Crimson Glory.

Class III. Double types: Flowers with true (or only partially transformed) sepals, true petals, but all stamens fully transformed to petals. In addition there may be extra petals of similar appearance not accounted for by transformation of stamens. Examples: Shishu, Gable hybrids La Premiere and Louise Gable, and *indicum* Sweet vars. *macrantha* PI 78380 and Beni-kirishima.

Class IV. Hose-in-hose types: Flowers with sepals fully transformed to petals and fused to a tube so that calyx and corolla look alike and appear to be two cycles of petals, one growing within the other. A hose-in-hose flower may be a single hose-in-hose, semi-double hose-in-hose, or double hose-in-hose. Examples: single hose-in-hose, Kurume Coral Bells; semi-double hose-in-hose, Pericat hybrids Harmony, Glory, Splendor, Richesse and Rival and *indicum* Sweet (*macrantha*) Warai-gishi. I have not yet observed a flower that could be described as a double hose-in-hose within these definitions.

It should be noted that occasionally an azalea may display flowers of more than one class at the same time or its flowers may vary in class in different years.

FREDERIC P. LEE.

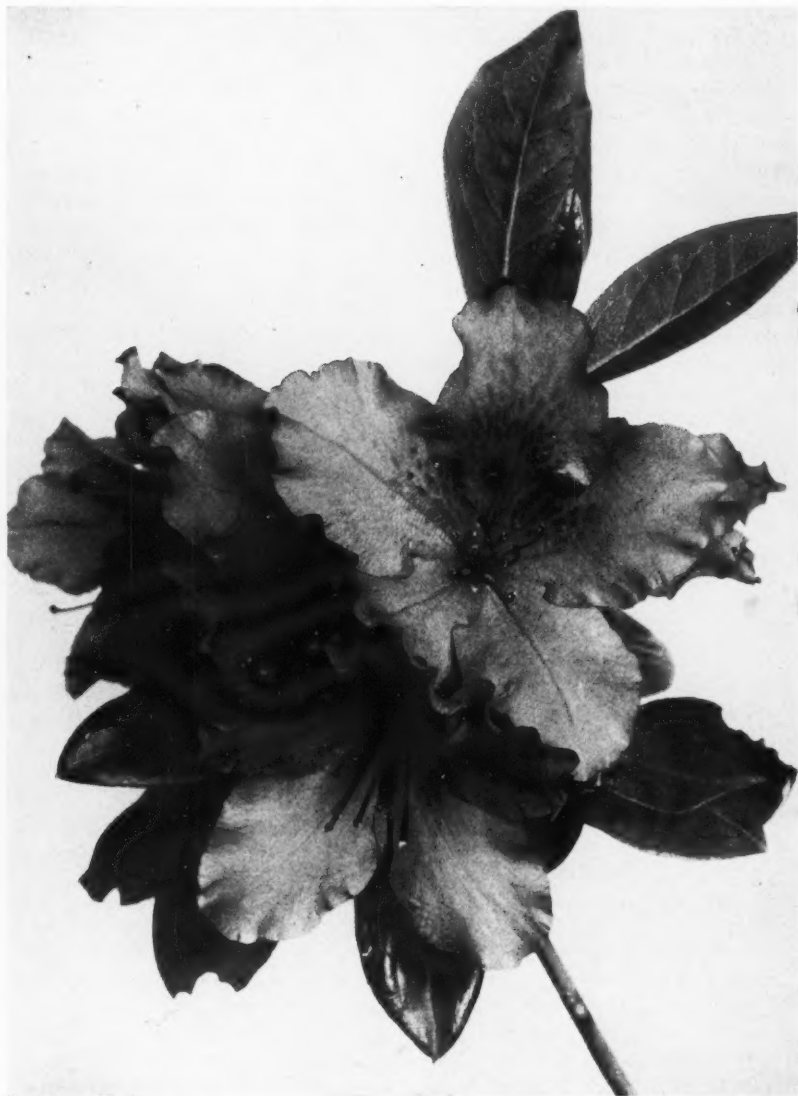
Azalea, G. L. Taber (See page 46)

Among the many so-called Indian azaleas, that the writer purchased in the course or the last two years for study and use in hybridization work was the plant named above, listed as a hybrid produced at the Glen St. Mary Nursery in Florida. At a first quick look, as it arrived in the autumn one might well think that it had more or

*Robert L. Taylor*

[See page 45]

Azalea, G. L. Taber



Robert L. Taylor

[See page 48]

Rhododendron scabrum

less the habit of the clone known as Omurasaki, with maybe a touch of old "indica alba" which as all know is really *Rhododendron mucronatum*, a dependable azalea for these parts and beloved for many years. The parentage has never been disclosed as far as we have found out.

Coming in the autumn, it was placed in the cold pit house along with all the other clones, passed the winter with no sign of difficulty and in mid-April was literally smothered in bloom. The illustration gives a good idea of the size and style of the flowers but it does not fully catch the pattern of tender coloring. The ground color, of course, is white, but it is so covered with a wash of tender pink that only the irregular margins show white. The blotch on the upper lobes is almost crimson. Practically every visitor who came was delighted with the flower but the best news came with and from a visitor, who remarked, "Well, I see you have old Taber. I have had that outside here for about ten years!" It seems that the plant is winter hardy here and has been through enough of the vicissitudes of our changeable winters to merit the general term "hardy."

My own plant has now been left out of doors to see how it may behave in the company of many clones of known hardiness. Others will follow it to live or to die as they may for there seems to be much confusion about the relative hardiness to cold, on the part of these Southerners surviving from the early days. From evidence that we now have here, it is probable that more are resistant to cold than one might now suspect and reports will be added in this section as the data accumulate. Meantime, it remains one of the mysteries of horticulture, why this most lovely sort is not planted while people continue to waste money and time and space on some of

the poor stuff that is sold in the Kurume section!

Rhododendron scabrum G. Don. (See page 47)

The inflorescence illustrated in the figure was by no means the largest produced from the plants in question, two purchased from the Glen St. Mary Nursery Company. It is quite large enough, however, to show how the flowers pile up into a head almost of the same character as that found in the Catawbiense rhododendrons. It shows also the size of the bloom, the waved margins of the corolla lobes, the pattern of spotting in the upper blotch, the carriage of the ten rather short stamens, and suggests to the knowing the intensity of its red color, which almost exactly matches in degree the green of the somewhat leathery green leaves.

The habit of the bush is well described by Wilson's phrase, "laxly branching." Whether or not in the northern garden where it is lifted each winter to be carried through in an unheated pit, it will ever be able to "make a bush" is doubtful. It takes the winter temperatures well, shows no shock on transplanting and seems tolerant of the treatment, but apparently will need a sunnier location for summer if it is to make good flower buds for the following season.

It was purchased, of course, primarily to see the species and to have pollen for hybridizing. In 1946 it accepted pollen from rather widely diverse clones and its pollen was fertile on many more. What the outcome of these crossings will be remains to be seen. The only clones now owned which are not entirely hardy to cold here are several given the writer by the late William Judd of the Arnold Arboretum, all with Kurume varieties as

seed parents. The flowers are no better than those of other clones in which both parents are cold hardy and none approached the wonderful scarlet red of the scabrum parent. In the crosses made here, it is hoped that some indi-

viduals will be found from the large populations that will be cold hardy and will carry over the fine red of the parent, as well as something of the heavy texture of the leaves which are almost like those of a "true" rhododendron.

Narcissus Notes

B. Y. MORRISON, *Editor*

Daffodil Notes from Oklahoma

In 1935 I was fortunate in seeing a large spring flower show with daffodil displays and fine displays in private gardens. My serious daffodil gowing began then. My collection has been added to every year since then until it comprises over 300 varieties.

I am not particularly fond of yellow trumpets, but because they give early bloom and the garden visitors love them I try to keep a representative collection.

The rock garden varieties *Minor* variety *minimus* and *Minor* variety *nanus* are delightful. *Minimus* is smaller than *nanus* and much earlier. *Minimus* has burst through the snow just after a February storm. Its tiny stem is only three inches tall and its blossom one inch long.

Magnificence although listed as very early usually opens with King Alfred. King Alfred has not been a good performer in this locality although it has done well in my garden. Hebron's blooming habits are more reliable and it is sometimes earlier. Its petals are wider than those of King Alfred and more overlapping and the trumpet is more refined. Godolphin sometimes opens as early as King Alfred. It is larger, but not superior.

Diotima, although half again as large as King Alfred, does not appear coarse. The petals overlap nicely and its tall stem is in proportion to the size of the

flower. Kandahar, Robert Sydenham and Golden Harvest are other giants.

The widely spreading trumpets. Giant Perfection, Advance Guard and Goldbeater do not bloom before King Alfred. When the widely spreading trumpets are seen front view only the tips of the petals are visible.

Lord Antrim and the later blooming Bulwark have trumpets with flaring edges. Principal is only medium sized. Some of the petals are pinched back until the sides touch. Royalist is valuable for its late blooming quality.

Forerunner is the earliest of the light yellow trumpets. It has a flat perianth with overlapping petals held at right angles to the trumpet. The trumpet is straight and slightly deeper than the perianth. The soft yellow color of Honey Boy is particularly pleasing to those who do not like too much bright yellow. Greenish-yellow Moon-gold is the last of the yellow trumpets to bloom.

Roxane is the first of the white trumpets to bloom. It is followed by Beer-sheba, which has a fine smooth white perianth and a long, slim, cream trumpet that fades to white. The neck is a bit weak, but this fault may be corrected when phosphates are available. It has been slow to increase.

Eskimo has increased rapidly and blooms prolifically. Its behavior and reasonable price will probably make it the standard white trumpet for this lo-

cality. China Clay is small; the petals barely overlap and are quite pointed. It is a slim, refined flower—not for those who like buxom blossoms.

Kantara is pure white. The trumpet of Mrs. E. H. Krelage opens a lemon yellow, but fades to creamy white. In some situations it has been slow to increase.

Effective is the earliest of the bicolor trumpets to bloom and my choice of varieties in this class. Immense is a medium-sized flower. The trumpet of Jack Spratt is very small where it joins the perianth, giving it a wasp-waisted effect. The petals of all of these are stained with the color of the perianth.

I have no sales resistance where pink-cupped varieties are concerned. I couldn't resist Rosary in spite of unsatisfactory reports from other localities. It has increased nicely, but has not bloomed although three years old. A soil test revealed a low phosphorus and potash content, which may be responsible for the lack of bloom. Love-nest increases rapidly. Its apricot crown usually develops the typical color. The trumpet of Rosabella becomes a very luscious pink with age, but it has a poor neck and perianth.

Carnlough has a very pale pink rim which fades as the flower ages. Pinkeen has the best perianth of any of the so-called pinks, but the cup is never pink in this climate. Mrs. R. O. Backhouse is the pinkest of the pink cups, but the perianth is poor and the cup pinches at the end. It is a consistent performer and a good multiplier. True Charm has a widely reflexed cup which has a pink tone to the body of the cup, but remains yellow on the reflexed edge. Both the cup and the perianth are poor.

Helios blooms with the early trumpets. It gives good bloom and multiplies rapidly. Fortune has been a consistent bloomer, but has not increased

rapidly. In two gardens it has been rarely more than deep yellow. When the cup does achieve its normal color it is very brilliant as if making up for past deficiencies. It is a fine, smooth flower and worth having even when the color is not up to standard.

Carlton is rather large and coarse, but the admirers of buxom blossoms like it. Havelock is similar in shape to Fortune, but is a trifle smaller. It does not have the orange cup of Fortune, but is an acceptable substitute in localities where Fortune does not color properly. Whitely Gem is not as brilliant as Fortune and the petals fade to white on the tips. Copper Bowl, like its ancestor Fortune, is very frequently poorly colored.

St. Egwin is a large flower borne on fine, tall stems. It blooms prolifically and is a reliable performer. Porthilly is similar in coloring to Odessa, with Odessa given preference in my garden because of a better perianth. Cocarde has a very flat cup. Knighton is a very striking color.

Damson tries to hide the beautiful coloring of its cup by ducking its head. Aristocrat has a poor neck and the petals pinch. The perianth of Truan is most peculiar. Three petals are pinched to each side so that the perianth appears to be divided in half. The petals of Jubilant twist and some of them tip forward.

Coverack Perfection is the most stunning of the bicolor incomps. It has a buff cup with a salmon edge. John Evelyn is a dependable, modest priced flower. Seraglio has an attractive scalloped cup.

Market Merry is not as early here as it is reputed to be in other localities. The cup is never solid red. Because it is very slow to increase, it could not be used for a market flower. Twinkle is a tiny flower of unusual color, but not of outstanding form. It has a very red,



Robert L. Taylor

[See page 53]

From top to bottom: Cheerio, Carbineer, Fairy King

short cup and a pinkish toned, poor perianth. It is suited to the rock garden.

Hades is about the size and coloring of Forfar although Forfar is listed as a bi-color Barrii. It does not hold the color so well as Forfar. Hades has given no increase in five years. Forfar is the first of the bi-color Barriis to bloom. Over half of the cup is a very red-orange. It has a better neck than Hades and holds its red color better. It is a better performer than Hades. Forfar has the brightest red cup of any daffodil grown in the garden.

The red edge on the cup of Firetail fades badly unless it is grown in partial shade. It is quite late and a reliable performer.

Galata has an unusual scalloped yellow cup with a narrow orange edge. The perianth reflexes—not too prettily.

Brunswick, which usually blooms with King Alfred, is the earliest of the large cupped Leedsis. The pointed petals appear thin, but have considerable substance. The fresh, pale yellow cup fades to cream white with a pale yellow edge.

Tunis is a very attractive color when it performs its best, but the primrose cup usually fades to pure white. Only occasionally does the honey-colored frill on the edge of the cup develop. Two-thirds of the bulbs from three plantings have died. In the fourth planting in soil made almost entirely of coarse sand, limestone chips and leaf mold eleven out of twelve bulbs have survived and multiplied.

Still Waters has a small, very pure, frosty white flower. Inclined to duck its head a bit on first opening, it soon overcomes this fault. The large flower of Daisy Schaffer is always popular. The first two plantings died—the third has lived through two seasons. The cup of Truth is so long that a casual observer would class it as a trumpet.

The flower of Her Grace is pleasing, but the stem is too short for the size of the flower.

Laughing Waters, although classed as a short-cupped Leedsi, resembles a freshly opened flower of Tunis. The cup fades to white as it ages. Mrs. Nette O'Melvany is a very satisfactory inexpensive flower. It gives good bloom and multiplies rapidly. White Lady is the most satisfactory variety I have. It is a free bloomer and a very rapid multiplier—a "must" for every garden that grows inexpensive daffodils.

Mystic is valuable for its late blooming habit. It has been slow to increase. Similar, but smaller, is Fairy Circle. It is suitable for the rock garden.

Queen of Spain has a bad habit of coming up too early and getting frost bitten. The blossom of Viscountess Northcliffe is too large for so short a stem. The blossom always nods—a trait inherited from its triandrus parent. Coyness is not becoming to so large a flower.

Moonshine has a wider, longer cup than Thalia, but is not so pleasing in proportion. Neither has a good perianth. White Witch is smaller than either and inferior to both.

February Gold rarely blooms in February here if planted in an open situation.

The jonquil hybrid, General Pershing, has the appearance of a medium-sized trumpet. It is a very deep yellow. Orange Queen is a very prolific bloomer. The true variety was difficult to acquire. It has a long blooming season. Lanarth has considerable dignity for a flower that is not large. It has not borne more than one flower to a stem.

Lady Hillingdon sometimes bears as many as three flowers to a stem. Tullus Hostilius has a smaller flower than Lady Hillingdon with a longer cup. It increases more rapidly and blooms

more prolifically. White Wedgewood is about the size and shape of Lady Hillingdon, but bears only one or two flowers to a stem. All three are good for naturalizing and make good arrangements.

The cups of the poetaz varieties, Scarlet Gem and Glorious, have better color if grown in partial shade.

Of the poets *Actea* is the earliest and best of the established varieties. Dinton Red has a poor perianth. *Recurvus* is kept in large quantities because of its very late blooming habit.

Doubles have never been satisfactory. The blossom of Twink frequently blasts and the color is always too pale. Van Sion comes green. It is kept so that I may have foliage for picking. Cheerfulness has been grown only two seasons. It does not blast and is valuable for its late bloom.

All of the small species are suited for the rock garden. *Bulbocodium monophyllum* sometimes blooms so early that it is malformed as a result of freezing weather. *Bulbocodium citrinus* has multiplied very rapidly.

Neither *Triandrus albus* nor *T. calathinus* has been permanent. The last plantings look happier than former ones. *Cyclamineus* usually lasts only one season.

Juncifolius asks only to be planted. It comes up in early fall, but cold does not damage the foliage enough to keep it from blooming. It has the longest blooming period of any variety in the garden.

Tenuoir was transplanted four times before I found out that it was supposed to be difficult to grow. It has given no difficulty. It has a very long dormant season so perhaps likes our long, hot summers. An occasional clump has been destroyed because it had developed mosaic, but it multiplies so rapidly that I now have a large stock in spite of that fact.

Canaliculatus lacks the grace of the other small species.

Tulsa, Okla. ELEANOR HILL.

Three Orange cupped Narcissus (See page 51)

Even before the advent of Fortune, for use by breeders, there was a concerted effort to breed red and orange cupped daffodils that would be of good form and carry cups in which the color would not fade. Since nearly all breeders were concerted with it, the number produced was legion and many of the good flowers that were presented in the late 1930s have never come into general cultivation, some perhaps with reason, others not. The uppermost flower, *Cheerio*, has never been a prime favorite here, as the perianth is not as smooth as we enjoy, but the wide bowl-shaped cup of deep yellow nicely stained in from the margin with intense red orange is a pleasant variation from the more smooth cups of many varieties. The flowering stems are long and strong so that it is fine for cutting.

The left hand flower, *Carbineer*, is beautifully smooth in all its parts and the slightly reflexed carriage of the perianth gives the bloom a jaunty look. The perianth is a good even yellow and the slightly frilled cup is deeper with an orange red margin. It too is long stemmed and fine for cutting.

Fairy King, the lowermost flower, has intense and even clear yellow in the perianth and a smooth cup with almost no frilling. It is deep orange red, almost uniform in hue from edge to base. It looks paler in the engraving than it is, for in the garden the contrast is strong and striking. It is less tall than the other two, but not a weakling or dwarf.

The point in grouping the three, which were all photographed on March 28, 1946, is to show that now we can have many kinds of red-cupped flow-

ers early in the season and to illustrate as well the points made about the character of cup and perianth, which are often mentioned in texts and not always understood by amateurs when they begin to study judging. The

broad overlapping segments in Cheerio are all that could be asked for save that they are not smooth. The segments in Carbineer are about perfect, those of Fairy King a little narrow, if one wishes to be severe.

Cacti and Succulents

W. TAYLOR MARSHALL, *Editor*

Director, Desert Botanical Garden, Phoenix, Arizona

Three Interesting Succulents

Sometimes succulent plants are treasured for the large and attractive flowers produced but occasionally we give a prominent place to a plant with insignificant flowers because of the unusual form of the plant. The species here described belong to the group valued for unusual form and color which makes them noteworthy even when not in flower.

Euphorbia obesa Hook. f. is a small, globe shaped or short cylindrical, dioecious plant which comes from the Graaff Reinet District of Cape Province, Union of South Africa. The plants are usually 8 angled, as is the one shown on page 55 but may have 7 to 10 angles, gray-green with numerous transverse dull purple bands formed of fine lines, and the surface marked with narrow grooves, which cross the purple bands obliquely. Circular flowering eyes are arranged in rows down the center of each angle.

The general appearance of a young, globose plant is that of a baseball covered with a plaid material. White and Sloane in "The Succulent Euphorbiae" mention that the first specimen imported sold in California for \$27.50.

Only a few colonies of the plant are known in its habitat where they are found either under shrubs or amid

boulders from which they can hardly be distinguished.

Fortunately the species grows easily from seed as export of the plants is prohibited. Only seedlings are available but these are in fairly plentiful supply.

The plant illustrated is a female and it is necessary to have plants of both sexes to produce fertile seeds.

Euphorbia Bergeri N. E. Brown was considered a form of *Euphorbia caput-medusae* until 1907 when it was recognized as a distinct species and named in honor of Alwin Berger, Curator of the Hanbury Botanical Garden at La Mortola, who published a small handbook "Sukkulente Euphorbien" in 1906. In this book Berger listed our plant as *E. caput-medusae* var. *minor*.

E. Bergeri is a dwarf succulent whose main stem is an extension of the thick main root; the branches are from 3 to 9 inches long, spreading in all directions in a manner strongly reminiscent of Medusa's head with its hair of serpents except that our Medusa head attracts rather than repels.

In the plant pictured the main root has produced two main stems, each with numerous branches, and in the center can be seen one branch that has crested, making the specimen even more valuable to its fortunate owner.



Euphorbia obesa

The place of origin and territory of distribution of *E. Bergeri* is unknown. It may have originated in South Africa but it is more likely a garden hybrid. It is frequently found in collections and can be found in the stocks of larger dealers.

Pleiospilos Bolusii N. E. Brown is one of the mimicry fig marigolds which hails from the Graaff Reinet and Aberdeen Districts of Cape Province.

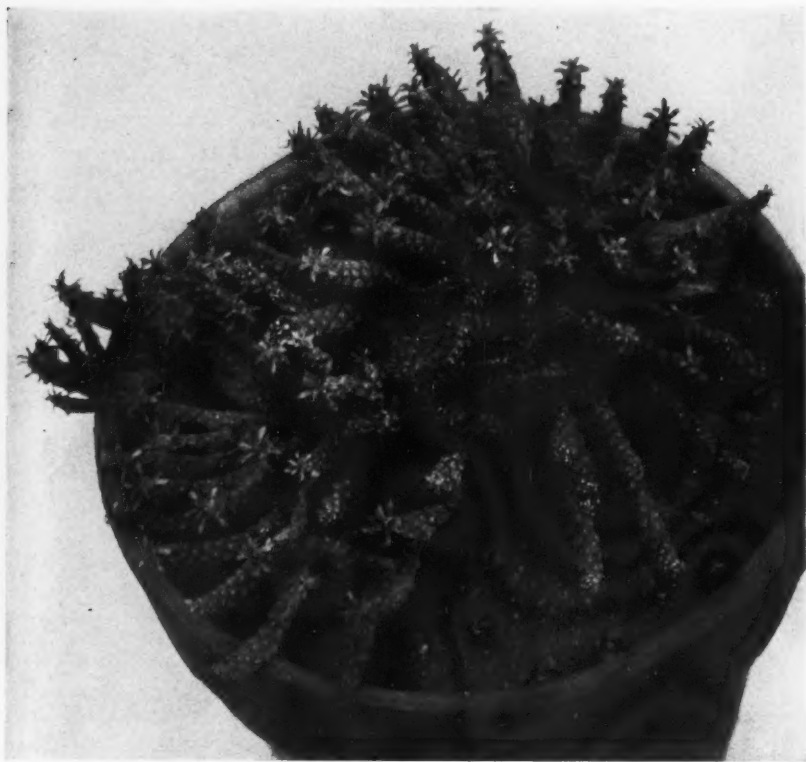
The plant consists of two or four greatly swollen leaves to each growth but a number of growths may arise from one root in older plants. Once a year a new pair of leaves arises from the juncture of the old leaves and at right angles to them; gradually the new leaves absorb the first pair until only

the epidermis of the old leaves remains at the base of the new ones.

The leaves have an upper flat face, the lower face rounded and keeled; the epidermis is slightly uneven, gray-green tinted with brown and thickly spotted in dark green. The large, bright yellow flowers arise from between the leaves and open at or near noon and close in the afternoon.

The marked resemblance to the rocks amid which it lives is the sole protection of this and other species of the mimicry mesembryanthema and it is only when in flower that the plant can be easily located in its habitat.

A very similar species, *Pleiospilos Nelii* Schwant., differs principally in its coppery-apricot colored flower while



Euphorbia Bergeri

Pleiospilos simulans N. E. Brown has longer, narrower leaves and yellow flowers.

Increased Interest in Europe.

Almost immediately following cessation of hostilities in Europe interest in succulent plants became manifest and societies, suppressed during the war, and new groups of Cactophiles began publication of Journals. Andre Bertrand, President of L'Association Francaise des Amateurs de Cactees et Plantes Grasses, explained that this interest was a defense mechanism to take the mind from the hardships of the postwar period by concentrating on an

absorbing interest not even remotely connected with war.

The French journal "Cactus" commenced publication with the May 1946 issue, a 16 page magazine on good coated paper and well illustrated. Each succeeding issue has been better than the preceding one.

In Switzerland the Schweizerischen Kakteen-Gesellschaft has published a four-page journal since January 1945, and possibly before that, and in June of this year published "Sukkulenten," a yearbook of 24 pages on fine coated paper, well illustrated, and containing the publication of five new species and three new varieties of cactus.



Pleispilos Bolusii

The Swiss Cactus Society has eleven branches, each of which meets monthly to discuss phases of the hobby. The French Society has no branches as yet but is affiliated with Societe des Amis des Cactees et Plantes Grasses de Monaco. In May the French Society held an exhibition at the Museum d'Histoire Naturelle at which a large collection of mature, well grown plants were shown to a considerable attendance.

In England the Cactus and Succulent Society of Great Britain, an affiliate of the Royal Horticultural Society, commenced the publication of "The Cactus Journal" in September 1932 and continued it as a quarterly publication until December 1939 when war conditions made its continuance impossible. This Society has resumed publication with the July, 1946, issue

which is numbered Vol. 8, No. 3. The format is identical with the prewar makeup, consisting of 28 pages including four pages of illustrations.

In August 1945 the Yorkshire Cactus Society was organized and plans for a Journal formulated; this resulted in the issuance of The Yorkshire Cactus Journal as a quarterly magazine in March, 1946, when a 16-page pamphlet on fine glossy paper, well illustrated, made its first appearance. By July, when the second number was issued, the Society had seven branches throughout England and Northern Ireland and it was decided that the name of the organization be changed to "National Cactus and Succulent Society" and the third number of the magazine was rechristened "The National Cactus and Succulent Journal." In addition to the Journal a News Letter of

four pages is issued eight times a year to full members.

In Czechoslovakia two societies were active before the war, each issuing a magazine named respectively "Kaktusar" and "Kaktusarske Listy" and both groups are again active and plan to revive their magazines.

In a letter just received from Mr. Shurly, Editor of "The Cactus Journal," we are advised of the formation of a Cactus Society in Holland that plans continuing the Dutch magazine "Succulenta" at an early date.

Perhaps the oldest of the European Cactus groups is the Deutschen Kakteen-Gesellschaft which has published a magazine monthly since 1891 under the names "Monatsschrift fur Kakteenkunde" 1891 to 1929, "Monatsschrift de Deutschen Gesellschaft: 1929 to 1933 and "Kakteenkund" 1933 to the end of the war. We now learn that as late as September 1944 publication of the German Cactus Societies Yearbook, "Cactaceae," was issued on fine gloss paper with numerous fine illustrations.

We have had no word of the plans of the German Society for the future but we do know that two of the best of the German botanists interested in succulent plants have survived the war. Dr. Eric von Werdermann of the Botanical Garden and Museum of Dalhem who has described many new species of succulents is reported as on the job and Dr. Fr. Buxbaum of Austria is preparing translations of several of his excellent articles on physiological aspects of succulents for publication in America.

Further proof of European interest is reflected by the announcement by several publishers in England of revised editions of some of the more informative books which were unobtainable during the war years. These include new editions of "The Study of Cacti" by Vera Higgins, M.A., former editor

of The Cactus Journal, "Cacti" by Prof. J. Borg, late of the University of Malta, and "Succulent Plants" by H. Jacobsen, Curator of the Botanic Garden, Kiel, translated by Vera Higgins, M.A.

From France we learn that a new edition of "Les Plantes Grasses" by Emile Jahandiez, President de la Societe d'Histoire Naturelle de Toulon, which was first printed in 1935, is planned for the immediate future, as is also a new and revised edition of "Les Cactees Cultivees" by A. Guillamin, Professeur de Cultures du Museum d'Histoire Naturelle, Paris. This revised edition of Professor Guillamin's book was prepared in 1939 and was ready to print when the war started. Unfortunately the system devised by Curt Backeberg based on Britton and Rose's classification was used in this revision.

A French edition of your editor's book "Cactaceae" is planned to be issued in Paris coincidentally with the second revised edition in English. Preliminary publications leading to the revisions are now being published in both Paris and Pasadena.

Three Interesting Echeverias

Very few species of the genus *Echeveria* DC. are found in cultivation but the simplicity of the cultural requirements and the striking color of both plants and flowers would suggest a more extensive use of them.

The *Echeverias* are succulent plants either stemless or with short stems topped by a rosette of thickened, highly colored leaves, and bear very attractive flowerst in shades of yellow, orange, pink, coral or red on a simple spike or raceme, or sometimes in panicles. The inflorescence is long-lived and they make excellent cut flowers.

The leaves of the rosettes are usually flat, the margins smooth or crenulated,

often terminating in a short point. They vary in color from gray to reddish, through purples to powdered or waxy and in some species are covered with velvety hairs.

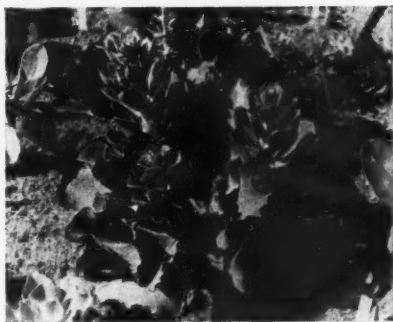
The distribution of the genus is from Texas, where one species occurs, through Mexico, Central America and into the northern parts of South America. There are about 80 species of *Echeverias* and innumerable hybrids but taxonomic information is not available in monograph form although we are promised a work on the genus by Eric Walther in the near future. Britton and Rose described 58 species in *North American Flora* Vol. 22, part 1, published by the New York Botanical Garden in 1905, and Berger in Engler, part 18a, 1930, keys 77 species without description. A non-technical work, *Succulents for the Amateur*, Pasadena 1939, describes and pictures some of the more popular species.

Many of the plants of this genus hybridize very readily and many fine hybrids are available. For this discussion two of the older hybrids and a new variety of an old favorite were selected.

Figure 1 shows a large plant of the very beautiful *Echeveria rosea grande* Hort., a garden hybrid of exceptional merit. This plant is more than twenty-two inches across and seven flower stalks had started at the time the picture was taken. The bright red markings which outline the fresh green, deeply crenulated leaves mark this as a most desirable species. The many, red flowers which nod on the two-foot stems add to its attraction and make interesting and valuable cut flowers.

Sometimes *E. rosea grande* is confused with *E. crenulata* Rose and frequently the latter name is applied to the former but *E. crenulata* is a very different plant.

Figure 2 shows a plant of *Echeveria flammea*, another garden hybrid, as



Echeveria rosea grande

grown in our garden. This plant is eighteen inches in diameter, the leaves forming the rosette are deeply channeled and shiny, reddish-bronze in color, and the beginning of several flower stalks are seen on which will later be borne the attractive pink flowers.



Echeveria flammea

Both this and the preceding species attain their best color when grown in full sun. Both are satisfactory for pot growth or for bedding outdoors.

Figure 3 shows a potted plant of *Echeveria Runyonii* Rose, variety *Macabeana* Walther, a variety described in 1935 in honor of the MacCabe Nurseries that first distributed the plant. The leaves are deep grape-green but so



Echeveria Runyonii var. *Macabeana*

heavily overlaid with bloom as to appear bluish-white. The flowers are coral red, contrasting with the leaves in a most attractive manner.

Echeverias can be easily propagated either by cuttings or from leaves. Cuttings should be made by removing the top of the main shoot or side shoots, which then are placed in pots without soil, the base of the stem resting on dry moss with the leaves supported by the rim of the pot. When roots form the cutting can be potted in soil.

Individual leaves can be removed by a gentle twisting motion so that they separate from the stem without injuring the dormant bud. Place the leaves on soil which has been grooved to receive them, putting the base of the leaf in the groove. The new plant will form at the base of the old leaf and gradually absorb it.

H. G. RUSH.

Displaying Succulents in Flower Shows

Many of the spring flower shows throughout the country will have sections for cactus and the other succulents, offering special ribbons for these classes. The biennial convention of the Cactus and Succulent Society of America will include a cactus show to be staged in the Irwin M. Krohn Conservatory, Eden Park, Cincinnati, on June 28th.

Since many months of preparation should be given to plants proposed for entry in such exhibits, a few words of advice to expectant entrants would not be amiss.

Cactus and other succulents, to be showworthy, should be:

1. Mature plants or, in the case of very large species, large seedlings or well established cuttings.
2. Clean and healthy plants in every respect. Spine mealy bugs, scale, red spider or any other infestation or any disease disqualify the entry.
3. Containers must be clean but not ornate. Many entries are discounted because of too gaudy pots or bowls.
4. Exhibits must be properly staged.
5. All entries must be accurately identified.

It is not too early to prepare now for spring and summer showing. Select your plants, repot them if necessary and assemble them where they can be watched. Spray them at the first sign of infestation. Supply needed fertilizer, water and sunlight in proper proportion for each species. It is advisable that you select more plants for grooming than you intend to display so that a substitute may be available for any specimen not in top condition at show time.

Next, make certain that you know the proper name of your plants and



A well-staged exhibit.

prepare your labels. Some exhibitors use a wooden plant label while others prefer a card, but if a card is used it should be 3x5 inches or less.

The ideal label should indicate the plant family to which each specimen belongs, its generic and specific name including the name of the botanist who so assigned it, its habitat and, if one is known, its common name. For example, if I were preparing a label for the first species mentioned in the article "Three Interesting Succulents," it would be something like this:

Family: Euphorbiaceae (The
Spurges)

Genus: Euphorbia Linnaeus
Species: obesa Hook. f.

Home: Graaff Reinet District, Cape
Province, Union of South Africa.
(Female Plant)

The manner in which your plants will be staged should be planned in advance. If your show space is to be

against a wall plan to put the tallest plants in back, the medium height plants in the middle row and low growing species in front so that all are visible. If your space is open from two sides the taller plants should be in the center and the lower growing ones near the edges. If all of the plants are about equal in height, blocks or shelves should be prepared to elevate those in the center of your exhibit.

As an example of a well staged exhibit we show a photograph of the entry of the Michael-Donnelly Cactus Garden, The Emporium, in the San Francisco Flower Show in the rotunda of the City Hall, August 21 and 22, 1946. In every respect, except labeling, this entry is commendable and the judges awarded it a first place. The labels could be improved by the addition of the name of the describing botanist. Note the use of clay pots for most of the plants but where glazed

pots or bowls are used the containers are restrained and in a color to harmonize with the plant housed.

Succulent plants are judged under the standards of the Cactus and Succulent Society of America as reported in "Handbook of Flower Show Judging" published by the National Council of State Garden Clubs, 1942, as follows:

| | <i>Points</i> |
|---------------------------------------|---------------|
| Maturity and Condition of plants..... | 30 |
| Number of Species in Collection..... | 30 |
| Staging | 15 |
| Rarity of Plants..... | 15 |
| Correct Labeling | 10 |

Desert Botanical Garden

Within a few minutes' drive from the heart of Phoenix, Arizona, one can come to a desert section where weird rock formations arise from the plain and giant saguaro cacti tower over the lower growing barrel cacti, hedgehog cacti, prickley pears and desert trees and shrubs. This is Papago Park where natural conditions prevail except for the auto roads, bridle paths, picnic facilities and fish ponds installed for the accommodation of visitors.

In the center of Papago Park one finds the most unique botanical garden of them all, the only desert botanical garden in the world, where native and exotic desert plants are grown under natural conditions and can be observed without the necessity of extensive travel.

Cacti from both the Americas, cactus like spurges from the African deserts, Yuccas and Century Plants, Aloes and desert milk weeds, creosote bush and joint fir, plants from every continent, live together in harmony and apparent content.

Plants are grouped by sections for convenience; the Arizona section contains all of the species of cacti, yuccas, agaves and most of the other desert

plants of the state, permitting the observation of the entire native flora by a short walk.

Ornamentals, food plants, fibre plants and those with medicinal properties are all available for intense study under most favorable conditions.

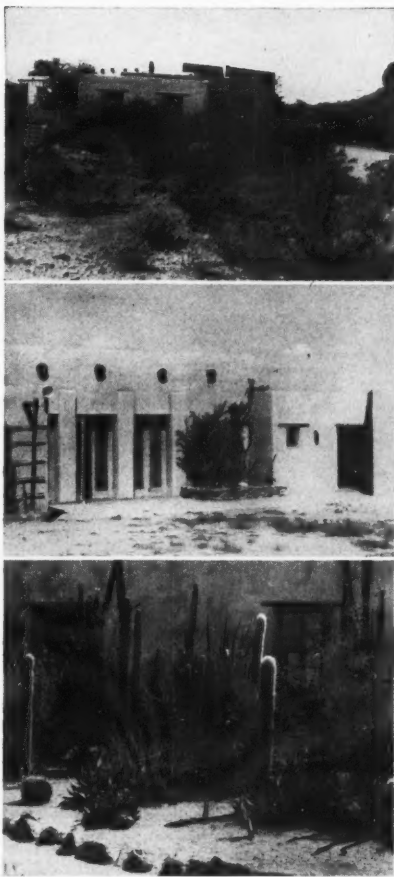
Dominating the garden is an administration building of modified Indian architecture which blends with its surroundings and accents them. An assembly hall of ample proportions, decorated and furnished in bright colors, provides the setting for lectures, classes and various social activities of the sponsoring group, the Arizona Cactus and Native Flora Society.

Opening from it are the President's office, the director's office and quarters, a large and well equipped kitchen and pantry, two guest bedrooms for the use of visiting scientists and various utility rooms.

The only formal planting in the garden centers around the administration building, where rare Mexican and South American Cacti are grouped artistically along walks to permit observation of each species in detail. Here, plants from regions of greater rainfall receive irrigation and attain to their top perfection; elsewhere in the 306 acres the plants are given no irrigation but grow under natural conditions.

The Arizona Cactus and Native Flora Society was organized in 1933 by the late Gustav Stark for the purpose that has so nearly been attained. It has been fortunate in having for its president and benefactor Mrs. Gertrude G. Webster of Phoenix and Vermont, for it is due to her foresight and generosity that so much progress has been made.

The first director of the Desert Botanical was Mr. George Lindsay, a young and energetic botanist, who headed several expeditions into our southwest deserts, Lower California



Homer Rush

Fig. 1. Administration Building, Desert Botanical Garden, viewed from the Arizona Natural Planting.

Fig. 2 Entrance to auditorium from the Patio.

Fig. 3. Planting of exotic cacti and other succulent plants near Administration Building.

and the Mexican mainland under Mrs. Webster's direction and with the cooperation of the Mexican government to assemble more than 10,000 plants at the garden. The choice of Mr. Lindsay as director was a happy one and his

work was well done and will last, but when he received the well-known greetings from his Uncle Sam and the government established a prisoner of war camp in Papago Park, it became necessary to close the garden to visitors for the duration.

Mrs. Webster informs us that the Desert Botanical Garden will be re-opened about November first when lectures and study courses will be resumed by a new director whose name has not, as yet, been disclosed. Plans include publication of the results of experiments and observations of plants at the garden and in the field and possibly an extension course of lectures in the closed season from May first to November first which will extend to other states.

An extensive and intensive drive for memberships amongst Arizonians and for associate memberships throughout the world will be undertaken in order that the scope of the work of the garden may be increased.

HOMER G. RUSH.

New Director for Desert Botanical Garden

Mrs. Gertrude Webster, President of the Arizona Cactus and Native Flora Society, announces the appointment of W. Taylor Marshall F.C.S.S. as Director of the Desert Botanical Garden.

Mr. Marshall is President Emeritus of the Cactus and Succulent Society of America, Honorary Vice President of the American Horticultural Society, Member of Honor of L'Association Francaise des Amateurs de Cactees et Plantes Grasses, Paris, and of the National Cactus and Succulent Society of Yorkshire, England, member of the American Society of Plant Taxonomists, Cactus and Succulent Society of Great Britain, London, Cactus and Succulent Society of Los Angeles and Associate Editor of NATIONAL HORTICULTURAL MAGAZINE, Wash., D. C.

He was granted a Fellowship of the Cactus and Succulent Society of America in recognition of his writings which include: Glossary of Succulent Plant Terms, Marshall and Woods, 1938; Contribution to a Better Understanding of Succulent Plants, 1940; Cactaceae, with botanical illustrations by Thor Bock, 1941; Succulent Plants, the first botanical work illustrated by three-dimensional color pictures, 1946,

and numerous articles in magazines both here and abroad.

Mr. Marshall has led botanical expeditions to Lower California, the mainland of Mexico, the West Indies and on our own deserts which resulted in the publication of a number of new species of cactus. A revised and enlarged edition of his book, Cactaceae, is now in preparation and will be released simultaneously in America and a French edition in Paris.

A Book or Two

Make Your Own Merry Christmas.

Anne Wertsner. M. Barrows and Co., Inc., New York, N. Y., 1946. 112 pages, illustrated. \$2.00.

This is a very jolly book, one in which the spirit of the author has come over into the printed word with more than usual success. No one could possibly read it without feeling the Christmas Spirit that it embodied in the festivities of the occasion.

Primarily it has to do with decorations of every conceivable sort from the most simple to the most fantastic but praise be, nothing of the bizarre. Finally it includes a chapter of recipes which just to read will set one sniffing in anticipation. Need one say more?

Camellias in America. H. Harold

Hume. J. Horace McFarland Co., Harrisburg, Pa., 1946. 350 pages, illustrated in color, black and white and line. \$25.50.

This is a sumptuous book. It weighs plenty and is somewhat difficult to handle except on a table, but it is worth it all. One always reads what Dr. Hume has to say with respect and attention and this work is no exception, even if the author modestly begins his preface with "This volume, *Camellias in America*, sketchily covers much time and

space." The reviewer would quarrel with the word "sketchily." It is not so!

Whatever you might like to know about in dealing with camellias is there, sometimes briefly enough but usually in considerable detail, even at times to the borders of being repetitious.

Coming at a time when there is a terrific revival in camellia collecting and growing and when there is a newly formed American Camellia Society, it should do much to offset the possible dangers of a revival, since all revivals have their own peculiar dangers. Perhaps it will be the steadying hand to keep from excess!

If you can steal that much money from the plant budget, buy it by all means. The reviewer did so; he prescribes nothing that he has not experienced! He, fortunately, lives beyond the acknowledged limits of camellia growing, which will save him money, in this day, when plants have reached prices that are phenomenal.

Shade and Ornamental Trees for South Florida and Cuba, by David Sturrock and Edwin A. Menninger. Published by Stuart Daily News, Inc., Stuart, Florida, 1946. Pp. 172. Bound.

Short descriptions of about 1,000

trees arranged alphabetically by family, genus and species. Common names given only where general usage in southern Florida has required their inclusion. The publication is of especial significance because no tree has been included that has not been actually observed growing either in southern Florida or Cuba by the authors, who are plantmen of some experience. Of equal importance is the preliminary discussion, about 45 pages long, which gives various lists of trees to meet special planting problems such as dry or wet soils, salt in the soil or air, excessive winds, as well as lists of selected trees for foliage or flower in landscape effects.

C. O. E.

Notes on the Mango, by David Sturrock. Published by Stuart Daily News, Inc., Stuart, Florida; in cooperation with the Atkins Institution of the Arnold Arboretum, 1944. Pp. 122, paper cover.

Mr. Sturrock has extracted pertinent material from some sixty publications which discuss the mango in various parts of the world's tropics. The notes have been arranged by subject matter to cover the history of the mango, its propagation, cultivation, diseases, marketing and harvesting, the whole interspersed with remarks of the author from the standpoint of southern Florida where the mango is of increasing importance. Short descriptions of some of the better known varieties are given, supplemented by outline sketches of their fruits in longitudinal cross-section.

C. O. E.

Geraniums. Pelargoniums for Windows and Gardens. Helen Van Pelt Wilson. M. Barrows & Company, Inc., New York, 1946. 248 pages, illustrated. \$2.75.

This is a very useful handbook of

popular discussion carefully arranged over a framework of facts, and with a neat straddling of the geographic fence.

The Californians can look upon all this as shrub material winning the admiration of the tourist and the derision of the "learned," but none-the-less a marvellous lot of material for the collector, with which he can indulge his fancy in a great variety of ways.

Botany: Principles and Problems. Edmund W. Sinnott. McGraw-Hill New York, 1946. 726 pages, illus. \$4.50.

"Plants are far more than interesting playthings. They are a conspicuous and inescapable part of the world we inhabit. They make life possible for us by providing food, clothing, fuel, shelter and many other necessities. More important still, they are *alive* and thus endowed with those remarkable qualities which have always made all living things eagerly studied by man, not only for their own sakes but for the light which they may throw on many human problems. If education is indeed an understanding of our surroundings, surely no one should pretend to be educated well who is unfamiliar with plants and their activities." With these words Sinnott invites the student to study his textbook of botany with an attitude, "the truly scientific attitude (that) is both critical and inquisitive." That Professor Sinnott has written a readable and effective text is attested by the fact that we are noticing here the *fourth* edition. Only one other text in its field in this country has reached that mark. Though much new matter has been added, including antibiotics, plant tissue culture, allometric growth, viruses, and the use of tagged atoms, among other topics the book shows its old familiar face, only having put on a little weight since 1935. Printed in large open type and illustrated by many

photographs and line drawings, the horticultural reader will find in this book a clear, concise explanation of the fundamental principles of plant science.

JOSEPH EWAN.

Greenhouse Gardening for Everyone.

Ernest Chabot. H. Barrows and Company, Inc., New York, 1946. 266 pages, illustrated. \$3.00.

This most interesting small book is an amateur's testament of his own pleasure and success in having and keeping a small greenhouse. The first 76 pages are the meat of the matter for the amateur who is already a gardener and needs to know most about the greenhouse itself. The balance is the primer of and for the plants that the beginner will certainly want to try. The one thing that is missing and which we would like to have from Mr. Chabot, is how one learns to manage the constant procession of things coming on and going off. This is something like learning to have a dinner all cooked at the moment so that it can be served in the proper time!

It is Easy to Grow Herbs. Bunny and Phil Foster. Privately printed, Laurel Hill Herb Farm, Falls Village, Conn. 32 pages, illus. \$.50.

This is a small paper-covered booklet with the emphasis put simply on the way to grow herbs from seed and on the more familiar herbs themselves. It finishes with directions for drying the harvested herb plants, and some recipes that spur one on to the kitchen! A very pleasant book, and one that would lure any beginner to hastening his way.

The Picture Primer of Indoor Gardening. Margaret O. Goldsmith. Illustrated by Harrie Wood. Houghton

Mifflin Company, Boston, Mass. 1946. 48 pages. \$2.00.

This is an amazingly compact book with really an astonishing amount of information packed in between the gay color pictures. No beginner could miss the point and the old hand will be delighted with the emphasis laid where it belongs.

There are a few minor matters that one might quibble about but they are minor. The reviewer for one is still not convinced that any amateur could bring into simultaneous bloom some of the combinations that flowered for the Wood's brush.

Gardening with Shrubs and Small Flowering Trees. Mary Deputy Lamson. M. Barrows and Company, Inc., New York, 1946. 295 pages, illustrated. \$2.75.

This is one of the best small books that the reviewer has seen. It is written by a practicing landscape architect who does not suffer from any of the influences that have made the great flower shows, although there are a few illustrations of overstuffed plantings.

For the beginner, there are the most excellent discussions of the plant as a unit in design. This is hard to do save for fellow members of the craft and this is well done.

The plant materials that come in for somewhat detailed discussions are less regional than in most books, though they are somewhat so, with stress on the Atlantic Seaboard and parts of the Middle West. Most amateurs won't mind this as one chooses his own plants in spite of all professional help, sometimes in spite of common sense, but if he knows how to handle them, the result is often superior. This will delight old timers and should be invaluable to beginners.

The Gardener's Handbook

Lapeyrousia cruenta and *cruenta alba*

California and South Africa have much in common climatically and thus many Cape bulbs have found their way here where they often thrive as well as in their native land. Just when the little Irid *Lapeyrousia cruenta* arrived is unknown, but this "Flame Freesia," as it is called by some Green-Thumbers, is not exactly rare, nor is it overly common.

Its similarity to Freesia in growth and habits is particularly striking. If the corms or unflowered plants of either were placed side by side even the experts would be at a loss as to which were which. However, the flowers of *L. cruenta* are well named as the bright red coloration is so distinct that they cannot be overlooked when in flower, small as they are. Usually too the bulbs do best with Freesia culture, demanding some shade and a little moisture. Flowering occurs during May or early June, and seed sets with no effort at all.

In the writer's garden, which is inland from San Francisco, several small plantings were made some 10 years ago. The bulbs that were placed in too sunny a location soon vanished, but under several trees or along the east side of the house the present number of bulbs must run into the hundreds, for the neglect during the war years has been to their favor. The bulbs in the light sandy soil have done best, but the heavy adobe soil seemingly presents no problem. Seemingly too the seed can lie on the ground all summer without harm, for a little rain or water in late October or November will promptly cause it to sprout. Neither is it a problem to start the seed in the greenhouse provided one uses the fall starting period. However, it is a painful waste of effort to try to germinate the same seed in the spring. It just isn't done.

Like Freesia the *cruenta* often flower the first year after planting, so it takes only a small start to establish the plants. The corms normally grow some three or four inches deep and can stand considerable frost. A friend in London reports that they are as hardy as "Old Nick" when grown in the open, so presumably Portland, Oregon, should represent the northern range of this plant. However, no one seems to know of it there.

Several winters back Major Pam of the R.H.S. Council sent the writer some seed of *Lapeyrousia cruenta alba*. Perhaps it was the coddling given this material as only a few seed germinated. Nevertheless the small white flowers that formed were really quite attractive and the bulbs were carefully replanted. In turn the old potting mix was dumped and used for other purposes. This was a technical error as every dormant seed sprouted the following year, and now most every pot in the writer's small glass house bears the evidence, but it is a pleasant pest and not objectionable.

In keeping with a procedure that should become more universal, *L. cruenta alba* bulblets have been turned over to the Baily Hortorium at Cornell University where they will be grown under natural conditions, and mounted specimens can be made as a permanent record.

L. S. HANNIBAL.

Daphne tangutica

While collecting for the Arnold Arboretum in 1925-26 Dr. Joseph Rock sent seeds of many interesting shrubs from Western Kansu and thanks to the late Professor Sargent quite a few of these have been tested in Manitoba. Many, of course, have not proved entirely hardy in our cold, dry climate,



but a few have and outstanding among these are two Daphnes, *D. tangutica* and *D. Giraldi*.

D. tangutica is an evergreen shrub growing, with us, to a height of twelve to fifteen inches, with glossy dark green leaves about half an inch wide and from one to one and a half inches long. The flower buds are formed in autumn and the pure white flowers start to open towards the end of May, about the same time as those of *D. cneorum*. Sometimes the flower buds are slightly tinged with pale purple but the flowers are white when fully open and as fragrant as those of *D. cneorum*.

Like *Daphne cneorum*, *D. tangutica* likes a good covering of snow in winter and is likely to lose its leaves if it is exposed to severe weather without that protection: if the winter snow is late in coming I find it advisable to

give both these daphnes the protection of a light covering of evergreen boughs to protect them from alternate freezing and thawing.

D. tangutica grows readily from seed and can also be raised from soft wood cuttings started under glass in July. The young plants may be expected to start flowering when three to four years old. This is the choicest of all broad leaved evergreens that have so far proved hardy in this climate and does not seem to be particular about soil; it does, however, like a sunny spot that is not too much exposed to the winds of winter.

D. Giraldi is one of the few daphnes that have yellow flowers. It grows from eighteen to twenty-four inches high and resembles *D. Mezereum* in habit of growth and size of flowers. Flowering in June, after the leaves are full grown, it is not so effective in blood as *D. Mezereum*, neither are the flowers as fragrant. It does, however, produce its bright orange berries very freely and in August, when these are ripe, *D. Giraldi* is quite ornamental. It grows readily from seed and the young plants start flowering when three or four years old.

F. L. SKINNER.

Dropmore, Manitoba

The Canary Island Date Palm

Members of the palm genus *Phoenix* are very frequently cultivated in the United States, both for ornament, and, as in the case of *P. dactylifera*, for commercial purposes. In Florida and California, one of the most stately and beautiful species is *P. canariensis*, the subject of this brief note. The largest member of this genus of about a dozen species, the Canary Island Date Palm is a rapid-growing tree which soon attains majestic proportions. It is excellent for use as a standard tree or in group planting, as shown in the

photograph, and also as an avenue tree. It stands trimming well, and is not at all messy in habit, as are some of the other species.

Phoenix canariensis is among the hardest of this group, and it apparently will stand temperatures far below freezing for a considerable period. It is found very commonly in all the islands of the Canary group, off the north African coast. Plants obtained directly from the Canaries are of this species, but the facility with which it hybridizes with the other members of the genus often results in hybrids being bought or sold under this name.

The accompanying photograph was taken by the writer in Golden Gate Park, San Francisco, and shows well how this beautiful palm adapts itself to the chill climate of that Californian city. The great mass of roots borne above ground is particularly evident, especially in the grouping of three trees. Others are growing at the edge of the Amphitheater in front of the DeYoung Museum in the Park.

In the Canaries, this tree is grown not only for its beautiful appearance and edible fruits, but also for the leaves, which are used to make brooms, baskets, and other household implements. The fruits have a pleasant flavor when fully ripened, but the fleshy layer is very scant and scarcely worth the effort of extensive gathering for culinary purposes.

This massive Phoenix attains a height of thirty or more feet under optimum conditions, and the leaf-crown is often twenty-five feet in diameter, with a hundred or so huge leaves fifteen feet long. As may be seen in the picture, these fronds arch gracefully out from the center, forming a nicely rounded head. The beautifully smooth green leaves, shading to yellowish on the midrib, are composed of dozens of folded, rather stiff leaflets, which form rigid



very sharp yellow spines toward the base of the frond.

As in other species of the genus, *Phoenix canariensis* has both male and female plants, and the beautiful clusters of bright yellow fruits will naturally not be produced unless the tree is a female one, and there are males nearby to effect pollination. The fruit-clusters often contain several hundred rather large dates, and weigh many pounds.

This palm needs no introduction to inhabitants of the southern states, since it is already well known there. It is one of the most satisfactory of all subtropical forms and its continued planting in the area is positively assured.

ALEX D. HAWKES.

Miami, Florida

The dentate lavender

To an unscientific gardener *Lavandula dentata* has been a pleasant puzzle. My first plant had gray leaves and a later one narrow green. Miss Rhode and Mrs. Clarkson write of *dentata's*

dark green leaves, never mentioning gray, while Hortus and the Cyclopaedia of Horticulture say only that the leaves are pubescent. Mr. Boston speaks delightfully of *L. dentata* but mentions no color.

Help came from the Curtis Botanical Magazine in which plate 400 shows a good portrait of the gray form. But I wonder if Curtis was not puzzled too, for he says "Miller (Miller's Dictionary) has given a very good account of this plant which we cannot do better than copy, observing that he describes the leaves as of a grayish colour, which they can scarcely be said to be, especially if contrasted with those of *L. pinnata* figured in the present number and which he had never seen."

Now *L. pinnata* grows in my garden and matching its leaves side by side with *L. dentata* gray form the grayness seems identical in both.

Perhaps as *L. dentata* may not be known to everyone I cannot do better than quote Miller too: "The *dentata* grows naturally in Andalusia in Spain, and also about Mercia; this has a ligneous stalk, which rises two or three feet high, furnished with branches on every side, which are four-cornered, and garnished with leaves placed opposite by pairs, indented regularly on both sides, almost to the midrib, in form of winged leaves; they are of a grayish colour, have a pleasant aromatic odour, and biting warm taste. The flowers are produced in scaly spikes at the end of the branches, standing upon long naked foot-stalks, they are four-cornered, hairy, and about an inch long, terminated by a few purplish leaves, in the like manner as the other sorts, which incline me to keep it joined to them; it flowers great part of the Summer, but the seeds very rarely ripen in England. It is propagated by slips or cuttings."

The green form has narrower leaves which are otherwise like those of the

gray but it grows somewhat differently. They gray is upright while the stem of the green curves down sweeping the ground.

In the Herbarist for 1935 are given botanical drawings taken from *Histoire Naturelles des Lavandes* by Baron Gengins de Lassarez published 1823 and here we find the two forms. No text is given and I have no access to the book but judging from the manner of growth shown in the drawing I think the green form must be *L. dentata* var. *vulgaris* and gray, *L. dentata* var. *B. Balearica*.

Another puzzle was: Why should the common name for *dentata* in California be French Lavender when all the books speak of *Stoechas* as French Lavender? The answer is that until the time of Linnaeus this plant was classified with *Stoechas*. Gerard calls it *Stoechas: folio serrata*, Toothed Stick-adoue.

For California *L. dentata* is very useful in the garden as it keeps neat and trim and blooms the greater part of the year while the English lavender blooms but a short time in mid-summer.

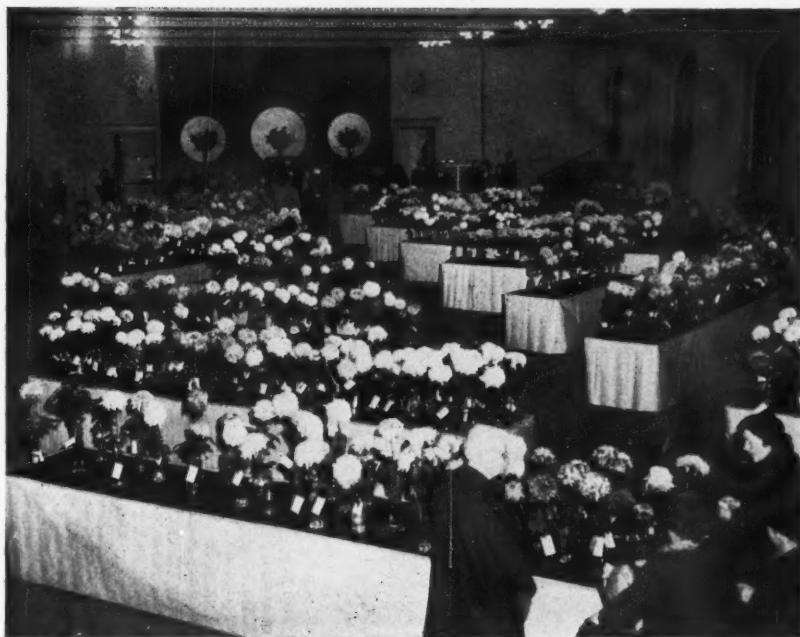
LAURA M. SIKES.

La Jolla, Calif.

Chrysanthemum Show, Portland Chrysanthemum Society

The Portland Chrysanthemum Society's eighth annual show was one of the most outstanding displays to date, with approximately 1,350 entries competing for top honors in the specimen and arrangement sections.

The two-day show, held November 2nd and 3rd in the sunken ball room of the Masonic Temple, held a record breaking attendance of over 25,000 persons by actual count, from the time the show opened at noon Saturday until closing time Sunday night. The thousands of visitors passed admiringly

*Herb Alden**General view, Portland Show*

through the aisles between tables laden with specimen blooms. It is hard to imagine a more appropriate place for a chrysanthemum display than this sunken ball room, since one may stand on the ambulatory above the ball room and gaze down on the density of blooms and dainty colors and realize each color means a perfect bloom, and all this means a real thrill to a chrysanthemum lover.

The show was artistically staged with an open square formation as center feature of the lower floor. The tables radiated from this square following the formation of the sides of the square, each table filled with a perfect rainbow of blooms.

The highest scoring blooms were shown on a black velvet draped stage, each bloom named and bearing the

name of the grower. The entire arrangement was in tiers with the highest peak of the black background accented by three huge golden discs before which were bouquets of the green chrysanthemums, Major Green and Nightingale, in tall black metal containers. The whole effect was decidedly eye-catching. The sweepstakes bloom held place of honor and was shown alone on the top tier, with the other special first award winners on a second tier and runners-up for first honors on a lower level.

At the opposite end of the hall, the fine collection of blooms from the Portland Chrysanthemum Society's test gardens were shown. This was a huge display of many kinds and colors, with the central motif a large basket of bronze to yellow blooms. The general



Herb Alden

Mr. Hunter R. Greening, President of the Portland Chrysanthemum Society, shows prize flowers to Dr. and Mrs. Morgan S. Odell.

tier effect was followed here also, with baskets and bouquets of the gorgeous flowers grouped according to color. While these blooms had been grown originally for display purposes to advertise the show, they were quite lovely enough to cause the visitor to take more than a second look.

The test garden is unique with the Portland Chrysanthemum Society. A plot of ground was donated by Lewis and Clarke College for use by the Society as a proving ground for various kinds of chrysanthemums. The water necessary for use was also furnished by the College, but the hard work was provided by the Society members, who started from scratch and cleared the ground, planted and cared for the plants. Each plot had its own super-

visor who was assisted by the members who had time to go to the garden and give a few hours to fertilizing, disbudding, and doing all the other necessary work to produce prize winning exhibition blooms. A blackboard was used as a bulletin board where notes were left on what had been done to each plot.

This experiment, which will be carried on more extensively next year, was a successful venture, as the type of blooms grown proved. All the green chrysanthemums displayed at the show for decorations were grown at the test garden.

The show was opened to the public at twelve noon, with the Governor of the State of Oregon, Hon. Earl Snell, cutting the ribbon that officially opened the exhibit. The city Mayor, Hon.



Herb Alden

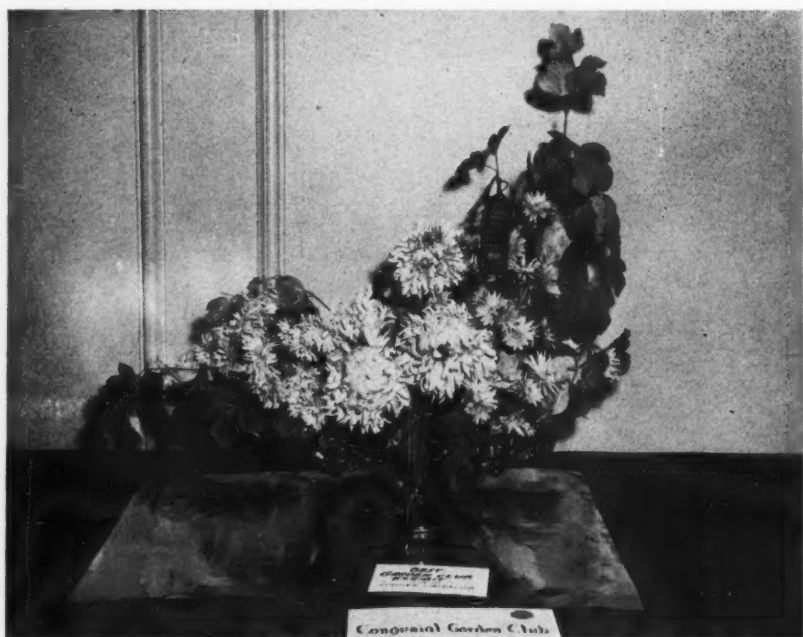
Prize blooms: Estrelita, Angelo, Early Monarch

Earl Riley, was also present, as were other dignitaries including Dr. Morgan Odell, President of Lewis and Clarke College. Dean Collins, editor of *Garden of the Oregon Journal*, acted as Master of Ceremonies.

The ambulatory was given over to the garden club and individual arrangement entries. Twenty-six garden clubs participated in the competitive arrangements. Some very striking arrangements were achieved, particularly the first award winner which was entered by Congenial Gardeners. The entire effect was of gold and yellow. Yellow to bronze chrysanthemums were shown in a brown iridescent container that picked up the gold coloring of the mat that held the arrangement. Autumn leaves of reds and soft greens blended well.

Many of the arrangements entered used autumn leaves with the red, bronze, yellow and deep yellow chrysanthemums. Other arrangements used miniature cattails, painted to blend.

The arrangements entered by individuals included such divisions as all white, Thanksgiving table, occasional table, twin containers, arrangements showing restraint and not using more than five blooms, miniature arrangements, arrangements using fruits as accessories, arrangements of tints and tones of one color, and corsages. The corsages were shown in a class alone, and smaller types of chrysanthemums were used, some all white with soft green bows, others in bronze and red shades with matching red and bronze ribbons, and some were even shown with silver ribbons all equally effective.



Herb Alden

The Best Garden Club Exhibit

Of course all the chrysanthemums shown were grown out of doors, which is the first rule of the Society, with no other protection than a covering against rain which must meet certain requirements. No flower grown under glass is eligible to compete in shows of the Portland Chrysanthemum Society.

JEAN HALLOWELL.

Carolina Yellow Jasmine (See frontispiece)

The principle that plants taken from their northernmost geographical range are those most likely to survive when taken still further north is one that has been known for a long time but it is not too often acted upon.

To Mr. and Mrs. Oliver M. Freeman, the principle is a familiar one and

they have more than one plant in their garden in Bethesda, Maryland, which proves the theory. In this case, the note treats of the Carolina Jasmine, *Gelsemium sempervirens*. Mr. Freeman collected the plant on April 30, 1933, about 10 miles west of Williamsburg, Va., and brought it to his own garden, where it was planted on the south wall of the garage. It slowly made itself at home and each year has become more vigorous so that now, it has climbed up some ten feet and tumbled down over a neighboring sweet-shrub in the canopy-like growth that is so familiar to travellers in the South, but with a vigor and abandon that speak well for the soil and situation chosen here.

The illustration that accompanies this note was taken from sprays cut

last April 18, and shows quite well the beautiful arrangement of the flowers and their formation and size. The dark evergreen leaves, unfortunately, appear almost as silhouettes. If one looks closely he can make out the details of the structure of calyx, stamens and pistil. Nothing, however, not even words, can convey the delightful fragrance of the flowers. It is rich and heavy but does not fill a room, even as much as do hyacinths or roses. Outside it comes and goes lightly in the air.

Whether or not plants from this plant could be carried even further north is a question but certainly the local gardener who wearies of the familiar vine might well consider this one, which has been sent from the Freeman garden to others nearby with success. It is easily propagated by or rather from the little plants that form when the branches touch the soil, for they root at the nodes in the same fashion as does the pestilential Japanese honeysuckle!

*From the Midwest
Horticultural Society*

Platanus occidentalis

The fall season with the passing of the heavy summer foliage highlights the trees and shrubs with bright or distinctive stems. Such a one is the sycamore, or plane-tree. During the summer the large lobed bright green leaves clothe the plant and cast an excellent shade both in small plants and in tall trees.

During the fall and winter the tapering trunk with patches of light tan, almost white, and brown bark stands out with pleasing clarity among the dark stems of the other trees. Generally a tall tree, the contrast is frequently noticed in the higher level of branches. Often, too, are the seed balls or buttons that form an intriguing pattern against

branch and sky. In smaller size the stem color would pass for an off-white form of the common white birch.

While this tree is found native along the watercourses, on the rich floodplains, it will adapt readily to other conditions and can be used in any garden. It is an excellent shade tree and can be used for streets, or for lawns and general landscape effects. The foliage alone is attractive enough to consider this for the garden but the peeling patches of vari-colored bark set this off as an excellent winter-color item for the dreary landscape.

My manuals tell me that sycamore for this tree should be discarded. However, I cannot think all the literature and all the vernacular will discard this common name so that there might be no confusion with a tropical *Ficus* from Egypt. Common names will be determined by the common people that use them, not by the exhortations of the cloistered scholars.

ELDRED E. GREEN.

Sorbus aucuparia

The Mountain-Ash is the subject of some controversy among garden circles. Some would relegate this to the list of undesirables because of its relatively short life in most cases. Along this same line birch, peach, and most kinds of willows and poplars would be dropped. Fortunately the public doesn't seem to mind replacing an enjoyable specimen once or twice in a lifetime, especially if they produce a good show in a few years.

The Mountain-ash is clearly a lawn tree. It is too small to develop much shade, and its attractive pinnate leaves, umbels of white spring flowers, and clusters of bright red tiny apples should be enjoyed from a near view.

The culture for this plant is like that of apples or crabapples. A good open situation, medium rich soil, and

that is about all. As the plant grows up it is subject to borers, and blight which may cause it to die out. In off-setting this is the early development of flowers and fruits, so that replacement is only a matter of four or five years.

Used as a specimen for lawns or as a component of a border, this plant is attractive spring, summer, and fall. It is a good home garden plant and under some conditions may prove to outlast many sturdier plants.

ELDRED E. GREEN.

Lilium pumilum

The beautiful Coral lily is one of my favorites. A small plant that usually is only a foot or eighteen inches high, the elegant flowers seem almost to be suspended in air. The stems are slender and the foliage very fine, and glossy green which sets off the brilliant blossoms.

This lily has the perianth recurved as in the Turk's cap. The colors are a flaming scarlet or a bright clear orange depending on the variety.

A small bulb, which should be planted about four inches deep, is shaped like a tiny pointed heart, usually smaller than an onion set. These bulbs can be produced from seed in two years' time and often tend to disappear after a year or two. If planted in clumps some will persist indefinitely.

Because of its small size this lily lends itself well to intimate gardens or between larger plants along a path. For its ease of culture this lily has never commanded the low prices of some of its relatives. However, a few bulbs and some saved seed will soon build up a stock in most gardens. General lily culture will suffice. A good loamy garden soil, and some summer shade, are about all that are needed, provided the drainage is good.

ELDRED E. GREEN.

Cornflower or Bachelor's Buttons (See page 77)

These are but two of the many common names of an old and well-loved garden annual, *Centaurea cyanus*, a winter annual for most of us. Native to southern Europe where it is a weed, it has long been familiar in the banal combination with red field poppies and the common daisy.

The plant of the wild, however, is a frail creature as compared with the buxom development of the modern seedsman, who now offers chiefly "double" flowers, which in this family means flowerheads with several to many rows of "ray flowers" and fewer disk flowers.

This increase in itself is no loss. If one were to regret anything, it is the relative disappearance of the "blue forms" before the whites, pinks, roses and maroon purples. All of these hues and more were known to old gardens, where the plant had self-sown for years, and frequently were pulled up with the first sign of color. One can and indeed must do the same thing today, if rogues appear in a sowing that is meant to be blue.

For this part of the world it is not true that the plant flowers all summer; here it has finished its span by July, no matter how carefully one tends it. The best flower is always the first, which tops the main axial growth; the next best are those that terminate the main branches; all the succeeding are slightly less good. If you gather your flowers, and if there are many undeveloped buds, putting the flowers deeply into a pail of water as you cut them usually prevents the wilting of stems that carry buds and spares one the wait for revival.

There is no special trick to seed sowing, nor any special depth that is best,

*Robert L. Taylor*

[See page 76]

Cornflowers

but about half an inch in good soil should answer all requirements. Sow thinly and thin rigorously if you want good bushes. They can be transplanted

but they do not like it. Sun and more sun for good vigor and good soil as inevitable requirements. There once were offered European strains of dwarf



Wild Celosia type.

stature, but now one finds here and there only the normal height of three feet or less.

If you want good color, buy good

seed each year or presently you will have from the self-sown plants too many "off" colors and fewer and fewer blues and doubles unless you are care-



"Chinese" woolflower

ful in saving seed pollinated by hand.

If you sow in the autumn, sow early enough that the plant may make a good rosette of leaves before freezing

weather; if you sow in spring, sow as early as may be possible, in order that a good plant may form before hot weather overtakes it!



Plume Celosia

Cockscombs (See pages 78-81)

Whether or not one needs to be concerned with the technical name of the cockscomb and save *Celosia cristata* L. for the familiar plant with its fasciated

head or whether one must consider this as merely a form under *C. argentea* L. is a problem that the gardener may leave to the taxonomist. In these days, however, when labor for seed saving



Royal Velvet

has been limited and when there may have been accidents of cross fertilization in the field, it is interesting to record that from seed of the feathered

types have come some plants with tiny cockscombs at the tip of the inflorescences. These were reminiscent of some of the wild celosias that have been

grown from seed out of India and Turkey.

There are those who will sniff at cockscombs no matter what their pedigree or provenance. And there are those or have been those who make a cult of their growing, with the ideal of a very dwarf plant with perfect foliage and an enormous head.

Your present reporter refuses to sniff and refuses to lavish extreme care on specimens. Three packets of seed were bought, Royal Velvet for the cockscomb type, Childsii and plumosa.

From the latter came the greatest variation in type of inflorescence but a very poor color range with none of the yellows, lemon to copper, or the rose-tinted forms, just the good old plumes of deep glowing crimson that set all the elite a twitter if the flower happens to be a rose and not a cockscomb! Among the not-true-to-name forms was the very interesting flower shown on page 78, in which the gardener can see all the familiar earmarks of the *Amarantaceae* to which these plants belong. If the sniffers were erudite, they would insist that one cannot expect much of a family which includes so many of the weeds that plague us. The knowing gardener, however, will recall that weeds are lusty things, greedy of good soil if it is to be had, but making shift under adversity which may mean heat, drought and poorish soil, blooming despite them all.

As for the celosias, they like good soil and even moisture. Heat apparently is no problem. If the soil is poor or the water scanty, they make small plants but flower they will, even at three inches. As plants go, they are coarse, but when well grown they are handsome. For cutting while fresh, they are superb, providing you cut enough of them at a time, judiciously

removing some of the leaves and always remembering that they drink heavily. Don't go "Japanesque" with them or put them in a flat dish. Cut an armful, make a bouquet like a sheaf, remember Rubens and Titian and don't give a fig for Whistler and Davies. And if you want to make your would-be esthete squirm, set the whole bouquet low, on the floor if you will, where a flood of light can shine on it, and if you (and they) aren't converted to Royal Velvet, there's no blood in you.

For the Chinese woolflower (C. Childsii) this reporter makes no claims. Its magenta pink may look silvery in some lights, but its head is always towseled and our reporter was "reared" to shun towseled heads!

Culture? The simplest. In this territory, near Washington, D. C., one can sow the small shiny black seeds out of doors in May and have a garden full of bloom in August. Remember that the plant comes from a family rich in weeds and that if the seed are fresh they will *all* germinate. They transplant reasonably well although they stand still for a week or so afterwards, which is just as well if you do not want plants five feet high. The plants to make cockscombs should be kept growing steadily; the other sorts can be topped early in life to make for branching, though this is hardly necessary as they usually branch well enough though sometimes high on the stem. In good soil, if they are grown for cutting, the plants can be six inches apart each way, though twelve as a minimum is better.

Location? Any place with good sunshine, good soil, just as if you were growing tomatoes—that is if you want an abundance of flowers for cutting.

Company? Anything else that is equally riotous and that flowers in August.

